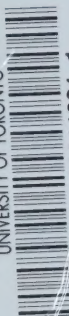


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A Study of Dental Manpower Systems
in Relation to Oral Health Status
PART 1 — *Ontario*

FINAL REPORT

FACULTY OF DENTISTRY



UNIVERSITY OF TORONTO

December, 1978

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A STUDY OF DENTAL MANPOWER SYSTEMS
IN RELATION TO ORAL HEALTH STATUS - PART I - ONTARIO

FINAL REPORT

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The Ontario study was patterned after the original international collaborative study of oral health manpower systems thanks to great co-operation by the Oral Health Unit of the World Health Organization, Geneva, Switzerland. The study was adapted to Ontario conditions by the principal investigators, Dr. A. Murray Hunt, Dr. David Banting and Dr. Donald W. Lewis and financed by National Health and Welfare, Canada, Grant number 606-1334-43. Dr. Mary K. Foster was employed as the project sociologist. In the limited time available for the complete project she used all of her tremendous professional and organizational talents to prepare the survey instruments, contact the many officials in health, educational and governmental agencies, train the interviewers and recorders, organize the field work, clean and analyze the data and write most of the reports to bring the study to a successful conclusion.

Dr. David Barmes, Chief of the Oral Health Unit, World Health Organization standardized the Ontario and Quebec study epidemiologists, Dr. A. Murray Hunt and Dr. John Stamm and their respective dental examiner teams. The epidemiologist examined one third of the adult and child participants.

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In the four centres approximately one hundred interviewers were hired. These men and women were conscientious workers and developed ingenious techniques for enticing respondents to co-operate in the study.

All of us wish to thank the more than thirty-two hundred children and adults who agreed to be examined and interviewed.

The Medical and Dental Officers of Health in each of the four centres provided us with invaluable assistance in making contact with

officials in the local professional associations and Boards of Education and in arranging space for the clinical examinations and interviewers.

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PART 1 BACKGROUND

CHAPTER ONE

INTRODUCTION

Purpose of Study

The project entitled "A Study of Dental Manpower Systems in Relation to Oral Health Status - I Ontario" has been funded by National Health Grant #606-1334-43. The general purpose of this study was to replicate the International Collaborative Study of Dental Manpower Systems in relation to Oral Health Status (ICS) conducted under the auspices of the World Health Organization and funded through the United States Public Health Service, Division of Dentistry (See Int. Dent. J., Vol. 26, 1976 for details of W.H.O. study).

Specifically, the objectives of the Ontario replication were:

- 1) to obtain information about the dental health status of the population in Ontario and later, Canada, including the dental services received, unmet dental needs and self-perceived dental needs and actions;
- 2) to obtain information about the characteristics or mode of delivery of dental services in Ontario, including manpower quality, types, working arrangements and payment mechanisms;
- 3) to define and analyze the relationship between the major features of the dental health of consumers, the characteristics of the providers and the overall efficacy (effectiveness and efficiency) of the dental health care system in Ontario;

- 4) to provide a mechanism and base-line for monitoring the effect on dental health status of Ontario residents of a developing system of delivery of dental services in Ontario;
- 5) to identify the differences in dental health status of consumers of dental health services in Ontario (eventually with others in Canada) and with several countries which have differences in manpower, payment and administration of dental services.

Dental health and sociological data were collected from 2,000 children, 1,600 adults and 200 providers of dental service. The data included comprehensive clinical, sociological, economic and demographic information from residents of four Ontario centres: Toronto, Oshawa, Cornwall and Thunder Bay and their environs.

Overview of Report

The report is divided into six parts. The background of the Ontario study and the conceptual framework of the International Collaborative Study are discussed in Part I. In Part II, the specifics of the Ontario replication are discussed including the features of the Ontario study. Part III presents the health status data including intra-sample comparisons and inter-country comparisons with the original participants in the ICS. Data for 8-9 year olds, 13-14 year olds, 25-34 year olds and 35-44 year olds will be discussed.

The social and demographic factors which may affect oral health status of the student and adult samples are examined in Part IV. The attitudes and behaviour of the two major providers; that is, hygienists and dentists are discussed in Part V. Part VI presents a summary and conclusions for the survey.

CHAPTER TWO

THE INTERNATIONAL COLLABORATIVE STUDY

Introduction

The International Collaborative Study was designed and implemented through the common interests of the World Health Organization and the United States Public Health Service in some generally accepted indicators that could be used to measure the impact of various oral health delivery systems. They felt the need for a study which would link the characteristics of manpower resources, oral health services, and the attitudes and values of consumers with oral health status. In this way it might be possible to identify the most effective components of a system; and thus, assist planners in individual countries in improving their dental health services (Int. Dent. J., Vol. 26, 1976).

With this general objective in mind, a committee set out to design a project which would meet some of these needs (Cohen, 1976).

Conceptual Framework

In developing a conceptual framework for any study, the first step is to identify the relevant variables - independent, dependent, intervening and antecedent. Although this can be a straightforward process, it becomes more complex when dealing with a subject like oral health status and use of dental services.

There tends to be a common assumption that consistent regular use of dental health services should lead to a better oral health status, than would non-use or inconsistent use of these services. There are further assumptions that regular consistent use of dental services

results in early attention to dental problems and in the transmission of a certain amount of preventive knowledge i.e., oral hygiene and diet. In turn, this ideal use of dental services could be seen to contribute to a better oral health status. With these assumptions in mind then, one could postulate that if oral health status were the dependent variable, that by determining the factors influencing the utilization of dental services one would also be identifying some of the influences on oral health status.

Two basic sets of factors influence the use of services: the structural characteristics of the system; that is, the organizational components in the delivery of service; and the social and demographic characteristics of the individuals which enable them or predispose them to use the services (Andersen, 1968).

The availability of the service and the accessibility to the service are two important structural characteristics. If structural factors were the only determinants of use of service then one could presume that if services were available in terms of numbers of practitioners and accessible in terms of economics, distance and time, that the services would be used. The individuals' social and demographic characteristics influence the priorities for action. Thus, an individual whose social and demographic characteristics did not predispose him to use dental services would use the services infrequently regardless of the structural characteristics of the system. By the same token, those individuals who were predisposed to use the services would use them more than one would expect even when the structural characteristics do not facilitate utilization.

Hypotheses

With this broad conceptual framework in mind, and although it was recognized that each dental health care delivery system had its own specific goals, some implicit and some explicit, the W.H.O. research team formulated the following general hypothesis as the basis of the International Collaborative Study:

Within an oral health care system, and across such systems, given control of certain mediating (antecedent or intervening) variables, the more available, accessible and acceptable the oral care provided to a population, the more positive is the effect on that population's oral health (Cohen, 1976).

Availability of service was defined as the availability of professional manpower, the availability of supporting personnel, the availability of central control, and the availability of personnel time devoted to prevention.

Accessibility to the services was defined as the physical ease of contact between consumer and provider, the minimizing of direct payment for services, the incentives given the provider to deliver care and the initiatives of the providers to enhance accessibility.

Acceptability of the service included acceptance by both the consumers and the providers as well as quality control.

The specific hypotheses which were generated from the general hypothesis were as follows:

Availability Factors

- 1) The greater the availability of manpower the better the oral health status and the treatment/need ratios.

- 2) The greater the availability of supporting personnel in relation to operating dental manpower the better the oral health status and the treatment/need ratios.
- 3) The greater the central control the better the oral health status and the treatment/need ratios.
- 4) The greater the personnel time devoted to prevention, the better the oral health status and the treatment/need ratios.

Accessibility Factors

- 1) The greater the ease of physical contact between consumer and provider the better the oral health status and the treatment/need ratios.
- 2) The less direct the payment for services the better the oral health status and the treatment/need ratios.
- 3) The more incentives given the provider to deliver care the better the oral health status and the treatment/need ratios.
- 4) The more initiative exerted by providers to enhance accessibility, the better the oral health status and the treatment/need ratios.

Acceptability Factors

- 1) The more acceptable the services are to the population the better the oral health status and the treatment/need ratios.
- 2) The more acceptable the services are to the providers the better the oral health status and the treatment/need ratios.
- 3) The greater the quality control, the better the oral health status and the treatment/need ratios. (W.H.O. Draft Report, 1977).

Research Design

In order to test this hypothesis the W.H.O. used the structural characteristics of the dental system as the sampling framework. Four features were identified as being significant in the delivery of oral health services. These were:

1. Type of Provider Employment: The categories include situations where practice is predominately private or government or a mixture of the two.
2. Types of Providers: By this was meant whether operating auxiliaries (dental nurses/hygienists) are a major, moderate or minor factor in the delivery of dental services.
3. Payment Procedures: The payment mechanism may be fee-for-service, private insurance or government payment; i.e., direct or indirect payment.
4. Population Served: The dental system may or may not have a major target group for special services.

Table 1 illustrates each of five original countries in the ICS, the United States and Ontario, Canada in terms of these four structural characteristics. As can be seen for the original ICS an attempt was made to choose countries which represented different combinations of the four structural characteristics.¹

¹ For a more detailed description of the Oral Health Care delivery systems of the countries involved in the study see: A. Bonito, The United States Study of Dental Manpower Systems in Relation to Oral Health Status: The Private Practice System, Mimeo, Dec. 1977, pp 25-33.

The next chapter will discuss the Ontario dental care delivery system including a discussion of the four structural factors used in the ICS. In addition the details of the methodology and research design for the Ontario replication will be presented, as well as the field techniques used in the data gathering process.

TABLE 1

STRUCTURAL CHARACTERISTICS OF
FIVE COUNTRIES IN ORIGINAL
W.H.O. STUDY, THE UNITED STATES
AND ONTARIO CANADA

FACTOR	AUSTRALIA	GERMANY	JAPAN	NEW ZEALAND	NORWAY	U.S.A.	ONTARIO CANADA
Type of Provider Employment	Predominately private practice	Predominately private practice	Predominately private practice	Private and government practice	Private and government practice	Predominately private practice	Predominately private practice
Types of providers	Minor use of operating auxiliaries	Minor use of operating auxiliaries	Moderate use of operating auxiliaries	Major use of operating auxiliaries	Minor use of operating auxiliaries	Minor use of operating auxiliaries	Minor use of operating auxiliaries
Payment procedures	Predominately direct fee- for-service	Predominately insurance	Combined fee- for service and insurance and government payment	Fee-for service and government payment	Combined fee- for-service insurance and government payment	Predominately direct fee-for service	Predominately direct fee- for-service Some private insurance
Population served	No target group	No target group	No target group	Children- major target group	Children- major target group	No target group	No target group

Source: W.H.O. Draft Report, 1977, page 17

PART II THE ONTARIO REPLICATION

CHAPTER ONE

THE ONTARIO HEALTH CARE SYSTEM

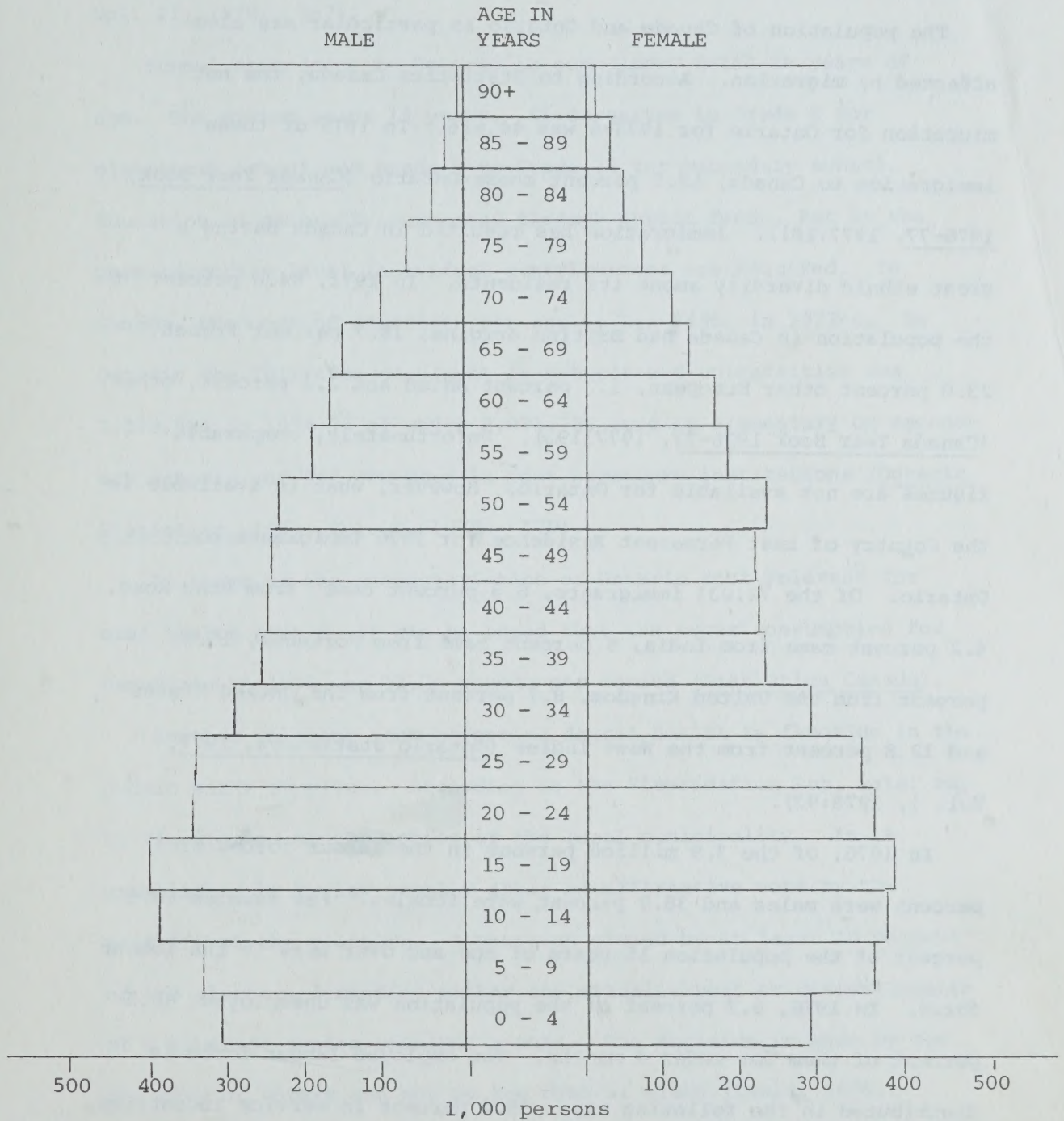
Sociodemographic Background

Canada is the largest country in the Western Hemisphere and the second largest country in the world after the U.S.S.R. Politically, Canada is made up of ten provinces, the Yukon and the Northwest Territories. Ontario is the second largest province in Canada with 10.7 percent of the total area of the country. To be more precise, this province covers 1,068,582 Km² (412,582 square miles) of which 891,194 Km² (344,092 square miles) is land and 177,388 Km² (68,490 square miles) or 17 percent is fresh water (Canada Year Book, 1976-77, 1977: 32-33). The total population of Ontario for 1976 was 8,264,465 (1976 Census of Canada). Of this total approximately one-half live in the "Golden Horseshoe" area of the province, a band rimming Lake Ontario from Niagara Falls to Oshawa. In 1971, the total population was classified as being 82.4 percent urban, 17.6 percent rural.

Figure 1 represents the age distribution for the province. Approximately 35 percent of the population is under 20 years of age while approximately 6 percent is over 70. In 1974, the number of live births was 124,229 while the number of deaths reported for the same year was 60,556 (Canada Year Book, 1976-77, 1977: 197). The gross reproduction rate has fallen from 1.560 in 1951 to 0.896 in 1975; that is, below the replacement level (Ontario statistics, 1977,

FIGURE I

POPULATION BY AGE AND SEX FOR ONTARIO, 1976



Source: 1976 Census of Canada, Statistics Canada, Ottawa

Vol. I, 1978; 77). Much controversy exists in Ontario over the declining birth rate particularly as it relates to declining school populations.

The population of Canada and Ontario in particular are also affected by migration. According to Statistics Canada, the net migration for Ontario for 1975-6 was 44,616. In 1975 of those immigrating to Canada, 52.5 percent chose Ontario (Canada Year Book, 1976-77, 1977:181). Immigration has resulted in Canada having a great ethnic diversity among its residents. In 1971, 44.6 percent of the population in Canada had British origins, 28.7 percent French, 23.0 percent other European, 1.3 percent Asian and 2.4 percent, other. (Canada Year Book 1976-77, 1977:193). Unfortunately, comparable figures are not available for Ontario. However, what is available is the Country of Last Permanent Residence for 1976 Immigrants to Ontario. Of the 72,031 immigrants, 6.5 percent came from Hong Kong, 4.2 percent came from India, 5 percent came from Portugal, 15.6 percent from the United Kingdom, 8.7 percent from the United States and 12.8 percent from the West Indies (Ontario Statistics, 1977, Vol. 1, 1978:92).

In 1976, of the 3.9 million persons in the labour force, 61.1 percent were males and 38.9 percent were females. For females 48.9 percent of the population 15 years of age and over were in the labour force. In 1976, 6.2 percent of the population was unemployed; 66.5 percent of them for under 4 months. The employed labour force is distributed in the following way: 39.4 percent in service industries, 24.9 percent in manufacturing, 16.6 percent in utilities, 7.4 percent

in transportation and other utilities, 6.6 percent in construction and 4.6 percent in primary industries (Ontario Statistics, 1977, Vol. II, 1978: 367).

School attendance in Ontario is compulsory until 16 years of age. The system spans 14 years. Kindergarten to Grade 8 for elementary school and Grade 9 to Grade 13 for secondary school. Education is generally supported through public funds, but at the post-secondary level individual contributions are required. In Canada, the cost of education per capita was \$436. in 1973-4. In Ontario the full-time enrolment in schools and universities was 2,279,984 in 1974-75 of which 2,071,784 were in elementary or secondary schools and 208,200 were in post secondary institutions (Ontario Statistics, 1977, Vol. I, 1978: 170).

In terms of the characteristics of Ontario most relevant for oral health status, it can be noted that the sugar consumption for Canadians in 1976 was 92.26 pounds per capita (Statistics Canada).

Another relevant item affecting dental health is fluoride in the public water supplies. According to the Fluoridation Act, water may be fluoridated at the option of the local municipality. It is established by by-law usually after an affirmative vote by the majority of the electors. A petition signed by at least 10 percent of the electors demanding either the establishment or discontinuance of a fluoride system requires a vote. The decision is made by the majority of voters and not by the Council alone (Lewis, 1976). Statistics Canada estimated that in 1972 60.8 percent of the population was drinking fluoridated water (C.D.A., 1974: 21). By 1976 this had

risen to 62.3 percent of the population residing in areas with fluoridated drinking supplies. For the Ontario replication four communities were chosen; Toronto, Oshawa, Cornwall and Thunder Bay; the first three urban areas being fluoridated and the last not. The areas surrounding the four urban areas had varying fluoride status.

In summary, then, Ontario is geographically a large area with a relatively small population density overall (11 people per Km²). However, the population is distributed unevenly with the bulk residing in the southern section of the province, particularly around Lake Ontario. Ontario is ethnically diverse and is still the preferred destination for most newcomers to Canada. The economy of Ontario is broadly based and the unemployment rate compared to other provinces in the country is low.

Oral Health Status

The most comprehensive dental study in terms of numbers of subjects covered was completed in 1973 (Nutrition Canada 1977). Some data for population age groups close to those in the present study are illustrated in Table 1.

TABLE 1

DECAYED, MISSING AND FILLED TEETH FOR ONTARIO RESIDENTS

BY SELECTED AGE GROUP

NUTRITION CANADA STUDY, 1970-72

	Age Group in Years			
	<u>8-10</u>	<u>12-14</u>	<u>20-29</u>	<u>30-39</u>
Decayed	0.9	1.1	1.8	1.9
Missing	-	1.5	3.1	6.9
Filled	0.9	2.6	9.0	8.3
DMF	1.8	5.3	13.9	17.1

Source: Nutrition Canada, Dental Report, 1977, pg. 140-3

The average 12 to 14 year old had 1.5 missing teeth and a DMF of 5.3. The average 30 to 39 year old had a DMF of 17.1 teeth of which 6.9 were missing.

Another longitudinal study was done to examine the effects of a fluoridated water supply on the permanent teeth of Toronto children. Commencing September 4, 1963 the water supply was fluoridated. In 1964 the average 13 year old child had 5.65 DMF teeth but by 1974 the DMF had decreased to 3.14 (Lewis, 1976: 24).

The Dental Survey of Canadian Provinces conducted in 1968-70 under the auspices of Health and Welfare Canada studied 390 Ontario children aged 13 years. It was estimated that 0.99 restorations were required per child while the average number of extractions required was 0.16. Using observable soft debris as a criterion, it was found that 61.5 percent of the sample had poor oral hygiene. In terms of condition of the gums, 37.5 percent were found to have mild gingivitis, while 6.7 percent had a severe gingivitis condition.

In 1968, the Canadian Forces did a study of 400 male recruits from Ontario and 40 female recruits from Ontario and Quebec. Some caries related data are presented in Table 2.

TABLE 2

DECAYED, MISSING AND FILLED TEETH FOR CANADIAN FORCES RECRUITS
BY SEX, CANADIAN FORCES DENTAL STUDY, 1968

	Sex	
	Males N = 400	Females N = 40
Decayed	5.98	6.17
Missing	3.24	4.00
Filled	3.79	5.42
DMF	13.01	15.59

Source: The Dental Condition of the Canadian Forces: Report of a Two Year Study, Canadian Forces Dental Services, Ottawa, 1968, pg. 23

Over 90 percent of the males and females were in the 17 to 21 year old age group. Males had 13.01 DMF teeth of which 5.98 were decayed. Females had 15.59 DMF teeth of which 6.17 were decayed.

Stamm (1973) reported that 506 young adults from Ontario community colleges aged 17 to 25 in 1973 had 11.93 DMF teeth. More detailed findings are presented in Table 3.

TABLE 3

DECAYED, MISSING AND FILLED TEETH
FOR ONTARIO COMMUNITY COLLEGE STUDENTS BY SEX,
1973

	<u>Male</u>	<u>Female</u>	<u>Total</u>
	N = 312	N = 194	N = 506
Decayed	2.34	1.81	2.14
Missing	1.60	1.30	1.48
Filled	7.79	9.14	8.31
DMF	11.73	12.25	11.93

Source: Stamm, 1973

The findings from these various studies cannot be compared directly because of differences in the age groupings of the sample, the experimental design and the criteria used to standardize examiners.

The next section will review the Ontario health care delivery system from an historical perspective and trace the development of the various structural components to the present time.

History and Development of the Health Care Delivery System

General Overview

The British North America Act of 1867 placed the responsibility for health care in the hands of the provincial government. In turn, the provincial government may delegate certain areas of responsibilities to municipalities.

The federal government, however, has always maintained a role in the delivery of health services. Before World War II the federal government was involved mainly in providing aftercare for veterans and medical and hospital services for Indians and Eskimos. Universal hospital insurance was proposed at the Federal-Provincial Conference on Reconstruction immediately after World War II, but was not accepted at that time (Hanson, 1963). Saskatchewan was a legislative pioneer in hospital schemes when it started to finance hospital benefits from general revenues in 1947. In 1958 the Federal government passed the Hospital Insurance and Diagnostic Act which included provisions for fiscal responsibility on the part of the federal government in providing hospital care for the entire population. By January 1961 all provinces had established such programmes which conformed with guidelines laid down by the federal government (Lee, 1974). The next phase of medical coverage was to set up a programme which included coverage for physician's services. This, Saskatchewan did in July, 1962. It was not without controversy, however, and resulted in the famous "doctor's strike" (Badgley and Wolfe, 1967). Needless to say, the conflict subsided and in 1968 the Federal Medical Care Act came

into effect which established a system of physicians' services whereby costs were shared between the Federal and Provincial governments, and standards were established guaranteeing the portability (to other provinces) and the universality (95 percent of citizens) of the programme.

The Ontario System

The provincial government of Ontario, is responsible for the regulation of health care, the operation of health insurance programmes and the direct provision of some specialized services.

Physicians's Services

Patients have a free choice concerning the physician from whom they wish to receive care and the physician is not obliged to accept a particular patient. The ratio of active physicians to the population for Ontario was 1:717 in 1968 and 1:548 in 1975 (Canada Health Manpower Inventory, 1976: 171). Payment is made by billing the medical care plan directly, in which case the physician is paid ninety percent of the Ontario fee schedule. Alternately, the physician may bill the patient directly and the patient recovers ninety percent of the fee (Canada Year Book, 1976-77, 1977: 236). Seventy-four percent of physicians in Ontario are in a private practice as general practitioners or specialists.

Hospital Services

Care in hospitals, excluding mental hospitals and tuberculosis sanatoria has been covered by the hospital insurance plan since 1961

and costs are shared by the federal and provincial governments' plan. Hospital ownership is either public, proprietary or federal. There are three classifications of hospitals by type of service: 1. general, 2. allied special (tuberculosis, extended care, rehabilitation, maternity, communicable diseases, paediatric, orthopaedic, neurological, cancer, nursing stations, outpost hospitals) and 3. mental. Table 4 lists the beds per 1,000 population in Ontario according to the types of ownership and service.

TABLE 4

NUMBER OF BEDS PER 1,000 POPULATION
BY OWNERSHIP AND TYPE FOR ONTARIO, 1976

Ownership	<u>Type of Hospital</u>			Total
	General	Allied/Special	Mental	
Public	5.3	0.9	1.7	7.9
Proprietary	-	0.1	0.1	0.2
Federal	0.2	-	-	0.2

Source: Canada Year Book 1976-77, 1977, pg. 251

Dentists Services

Few dental services are included in the legislation drawn up by the Federal and Ontario governments. Some surgical procedures in hospitals are covered as is dental care for hemophiliacs who require dental care in a hospital. Unlike five other Canadian Provinces, Ontario does not offer government financed dental services for children.

Children in foster homes and recipients of payments under the Family Benefits Act receive dental care under a programme financed by the Ontario government and administered by the Ontario Dental Association.

Dental insurance in Ontario is basically centred in the private sphere and it has become a fringe benefit to be negotiated between employee and employer. As of January, 1977 nearly 4.2 million Canadians had group dental insurance compared with 2.8 million at the end of 1975 (Armstrong, 1975).

Pharmacists' Services

The licensing and regulation of pharmacists is set out in the Health Disciplines Act. The Food and Drug Act controls the advertising of drugs and the Ontario Drug Benefit Formulary guides the pharmacist on the base cost for product selection. Ontario graduated 146 pharmacists in 1975 and in that year the ratio of licensed pharmacists to population was 1:1678 (Canada Health Manpower Inventory, 1976, 160-1).

Revenues and Costs

Ontario charges a monthly premium that covers both hospital and medical care. As of May, 1978 this premium was \$19.00 for a single person and \$38.00 for a family. An additional 5/6 of the cost comes from general tax revenues. Under this coverage the insured has access to a four bed ward. Semi-private and private is in addition to the basic cost. Employee groups of 15 or more persons are required to have payroll deductions for this purpose. The coverage for other residents is voluntary. Residents with limited incomes receive premium assistance and those over 65 are exempt from paying the premiums. A breakdown of expenditures per person on personal health care in Ontario is given in Table 5.

TABLE 5

EXPENDITURES IN DOLLARS PER PERSON ON PERSONAL HEALTH CARE,
1960 and 1975, IN ONTARIO

	Hospital Care	Physicians' Services	Dentists' Services	Prescribed Drugs	Total Expenditures
1960	50.83	23.18	8.09	7.77	89.87
1975	275.64	89.22	23.33	29.74	404.93
Percent Increase 1960-75	407%	284%	250%	283%	351%

Source: Ontario Statistics, 1977, Vol. I, 1978, pg. 137

Per capita expenditure for dentists' services rose 250 percent from 1960 to 1975 but the rise in expenditures for other forms of health care was even greater.

The next section will move from a description of the health care system in general to specifics involving the delivery of dental services.

History and Development of the Oral Health Care System

History of Dentistry

Barnabus W. Day, considered the "father of dentistry" in Ontario, called the first meeting of Canadian dentists in Toronto in 1867. Under his direction the Ontario Dental Association was formed, the first organization of Canadian dentists. At that time the number of dentists practicing

in Ontario was in excess of 100 (Gullet, 1971: 40-2). In 1868 the Ontario Dental Act was established which had the distinction of being the first such dental act adopted anywhere in the world. It was unique in that it related to dentistry alone and gave the powers of licensing and regulating the profession of dentistry to elected members of the profession who formed the Royal College of Dental Surgeons of Ontario (Gullet, 1971: 43).

The first dental school was established in Toronto in 1875 by the Royal College of Dental Surgeons of Ontario. The course was of four months duration. In 1947, the Ontario dental law was amended to provide for the education of hygienists and in 1951 the first hygienist course was established at Toronto. From 1919 to 1960 a one year course for dental nurses was also available at the Toronto school, but this was subsequently discontinued (Gullet, 1971).

Present Oral Health Delivery System

As previously mentioned, the British North America Act of 1867 delegated the responsibility for health care to the individual provincial governments. This means that ten different dental programmes could exist across Canada.

According to Stamm, (1977) however, the main method for delivery of dental care for adults in all ten provinces is the private practice, direct payment, fee-for-service arrangement. He estimates that 85 percent of Canada's dentists are engaged in private practice. At the same time he notes that there is an increase in the utilization of auxiliaries as well as an increase in the establishment of group practices.

Children in three provinces - Newfoundland, Nova Scotia, and Quebec are beneficiaries of publicly funded third party payment dental plans. In

addition, Prince Edward Island and Saskatchewan provide government operated, direct service dental programmes for children. The latter services use salaried personnel in central and mobile clinics. Saskatchewan uses the New Zealand type dental nurse as the main provider of dental service (Stamm, 1977).

Ontario does not have a province wide, publicly sponsored dental care system for children. However, ten areas including Toronto, one of the study sites, have a limited dental programme. In addition, the Northern Ontario Public Health Service has a treatment and preventive programme using mobile units (Curry, 1977).

Another steadily growing component in the delivery of dental services is the third party payment plans controlled by private insurance companies. These plans are mainly in conjunction with the private practice, fee-for-service system. At the end of 1976 approximately 18 percent of the Canadian population and 29 percent of Ontario residents were covered by private insurance (Stamm, 1977).

Manpower

There are 3,949 dentists in the province of Ontario. In 1977 the dentist to population ratio was 1:2093 (Proceedings, R.C.D.S., 1977). This compares to 1:2563 in 1965 and 1:2161 in 1950 (Ontario Statistics, 1977, Vol. II, 1978: 134).

The two dental schools in Ontario, The University of Toronto and the University of Western Ontario graduated 162 dentists in 1975 (Canada Health Manpower Inventory, 1976: 51). Specialists must work in the field a minimum of one year after graduation for the D.D.S. programme before continuing with specialty studies. In 1975 there were 332 specialists in Ontario in the following fields: Public Health (20), Endodontics (20),

Oral Surgery (63), Oral Pathology (8), Orthodontics (137), Paedodontics (32) and Periodontics (52) (Canada Manpower Inventory, 1976).

Seven types of dental auxiliaries are engaged in the dental delivery system in Ontario, for which training is given in eleven community colleges (Atkins and Ellis, 1977). The certified dental assistants are trained in one year. Preventive dental assistants require an additional three to five weeks of instruction. Certified dental assistants may qualify as dental hygienists after a further eight months of training. The expanded duty hygienists are dental hygienists who, after a minimum of one year field experience, take an additional semester at the college. A post diploma Bachelor of Science in Dentistry programme for dental hygienists is available for those who wish to become teachers and public health administrators. Both dental technicians and denture therapists have three year programmes (Atkins and Ellis, 1977).

The dental auxiliary student admission figures for 1977-78 are listed in Table 7.

TABLE 7

NUMBER OF STUDENT ADMISSIONS
TO COMMUNITY COLLEGE
AUXILIARY TRAINING PROGRAMMES, IN ONTARIO
1977-78

Dental Assisting (Full-time)	398
Preventive Dental Assisting	50
Dental Hygiene	224
Expanded Duty Hygienists	22
Dental Technology	20
Denture Therapy	16

Source: Atkins and Ellis, 1977, pg. 8

The denture therapists are unique in that they have more autonomy than the other auxiliaries. According to the Denture Therapists Act of 1974 (Bill 70), the denture therapists may work without the supervision of a dentist in the construction and repair of full dentures in an edentulous arch. Supervision, however, is required for partial dentures (Denture Therapists Act, 1974).

The ratio of certified dental assistants to population in Ontario in 1975 was 1:64,766. It should be noted that assistants trained by the dentist are not included in these figures. For the same year the ratio of licensed dental hygienists to population was 1:13,680 (Canada Manpower Inventory, 1976: 26,32).

Costs

It has been estimated that in Ontario in 1975 the cost per person for dentists' services was \$28.33. The total bill for dental services was \$233,338,000 or 7 percent of the total Ontario personal health expenditures which amounted to \$3,335,356,000. Health care presented a little over 5 percent of the Ontario Gross Provincial Product and dental services were one-third of one percent (0.36%) of the G.P.P. (Ontario Statistics, 1977, Vol. 1, 1978:136-7).

Oral Health Attitudes

Another important perspective on the dental health delivery system is the attitudes of consumers toward the system and the patterns of consumer utilization. The next section will review some of the Canadian literature on this aspect.

Attitudinal data gathered in 1969 from 177 non-dentistry health personnel in ten health disciplines indicated that 81 percent rated dental conditions as very high or moderately high in importance as a public health problem (Brown et al, 1969: 44).

However, a study of a random sample of 200 households in Toronto in 1971 reported that 40 percent of the residents had either never been to a dentist or hadn't seen one in over 5 years. Twenty-five percent had last been to the dentist between one and five years ago. Only 10 percent reported that they visited the dentist at least once a year (Finnigan et al, 1971: 33). There was a marked discrepancy between the perceived and actual needs of this study group. Only 42 percent indicated that they should have had more dental treatment in the past year whereas 87 percent of the people examined were actually in need of dental treatment at the time. Strikingly, 58 percent were in need of immediate dental treatment (Finnigan et al, 1971: 59). If confronted with an aching tooth, 54 percent indicated that they would rather have it extracted than restored. The more teeth a person was missing, the more likely he would choose extraction as the preferred method of treatment (Finnigan et al, 1971: 58).

A study undertaken in the London area in 1973 chose as its random sample, a group of 360 mothers. The mothers' attitudes to oral health

were found to be significant in the state of oral health and the future oral health practices of their children. The children received more regular care than did their mothers. Subjects from higher social classes tended to receive more regular care and to follow the preferred treatment plans more closely than did those from lower social classes. The lower social classes sought mainly symptomatic care while higher social classes were more preventively oriented (Lawton et al, 1973: 348-9).

In 1971, a survey sampled 220 people over 65 years of age in Metropolitan Toronto. It was found that the higher the perceived financial barrier the more likely a person tended to be satisfied with their present dental condition or at least to rationalize their dental needs. Interestingly, 60 percent of the older persons living in a senior citizens' housing project knew of a University Dental Clinic where costs were at a minimum yet they did not attend. However, 85 percent stated that they would attend if a dental clinic was in their building. Thus, convenience plays an important role in the utilization of dental facilities by older persons (Banting, 1971: 507).

In Hamilton, a random sample of 288 people over 65 years of age in 1972 found almost 60 percent of all persons required some dental treatment. However, there was little demand for dental services since less than 20 percent had visited a dentist within the last year and less than 50 percent had visited a dentist within the past five years. The perceived and actual needs of this group were markedly different. Of those persons who expressed a need for treatment for either their teeth or their dentures, only 18 percent actually required

care. Conversely, of those who stated that they had nothing wrong with their teeth or dentures, 56 percent actually did require treatment (Banting, 1971: 512-3).

Summary

In summary, then, the Ontario dental system can be characterized as being a private practice, fee for service system where most of the care is delivered by office based dental practitioners. Dental hygienists and denture therapists also provide care but their scope is limited. Less than one third of Ontario residents have any dental insurance. These plans are usually fringe benefits for employees arranged through private insurance companies. It would appear that a major factor in the dental health status of the province's residents has been the introduction of fluoride to the water supply of selected communities.

CHAPTER TWO

METHODOLOGY AND RESEARCH DESIGN OF THE ONTARIO STUDY

Introduction

As the Ontario study was designed as a replication of the International Collaborative Study, the researchers attempted to follow the model of the ICS as closely as possible. However, certain changes were made in the sampling framework, the sampling technique and the format of the instruments to meet the budgetary constraints and to reflect the different areas in the province. These changes will be elaborated on in the next sections

Sampling Framework

The ICS study chose one administrative unit to represent each country. The choice was based on the following criteria:

- 1) The city within the unit could not be a nation's capital nor the largest city;
- 2) the population of the administrative unit was to be between 300,000 and 1,000,000 with one third to one half of the residents concentrated in a metropolitan centre; and
- 3) a dentist to population ratio of at least 1 to 3,000.

Because Ontario is larger than most of the other countries in the ICS, and because of the diversity within Ontario (i.e. economically,

population density and fluoride status) four centres were chosen to represent some of the important characteristics of the province and the dental health care system. These centres were York County (Toronto), Durham Region (Oshawa), Thunder Bay District (Thunder Bay) and Stormont County (Cornwall).

Metropolitan Toronto has a population of 2,152,269 persons and 1,473 dentists for a dentist to population ratio of 1:1461. The water supply has been fluoridated since 1963. A large school dental programme exists in North York and a growing proportion of the general population is covered by dental insurance programmes.

Oshawa has 102,876 persons, 48 dentists and a dentist to population ratio of 1:2143. The Durham Region ratio is 1:2643. The water has been fluoridated since 1953 and there is a large amount of dental health insurance because the General Motors plant is the main industry and employer. Along with Toronto, Oshawa is in the "Golden Horseshoe area of the province" - an economically advantaged and generally affluent area adjacent to Lake Ontario.

Thunder Bay is the largest city in northwestern Ontario with a population of 108,571, 56 dentists and a dentist to population ratio of 1:1938. The district ratio is 1:2,204. Not only does Thunder Bay represent the northern section of the province but also it is the only non-fluoridated city in the sample.

Cornwall, situated in eastern rural Ontario, has a population of 45,743, 12 dentists and a dentist to patient population ratio of 1:3811. The ratio of the entire district is 1:4835. Although the area historically has been dentally under-served, over the last year

TABLE 8

POPULATION,¹ NUMBER OF DENTISTS,² DENTIST/POPULATION
RATIO³ AND WATER FLUORIDATION STATUS⁴ FOR SELECTED
ONTARIO COMMUNITIES, 1976

	Population	Dentists	Dentist/ Pop. Ratio	Fluoridation
Metropolitan Toronto	2,152,269	1,473	1:1461	Sept. 1963
York County	2,347,410			
Thunder Bay	108,571	56	1:1938	
Geraldton	3,007	1		
Longlac	1,833	1		
Manitouwadge	3,508	1		
Marathon	2,220	1		
Terrace Bay	2,110	1		
Red Rock	1,651			Dec. 1965
Other	13,734			
Thunder Bay District	136,634	62	1:2204	
Oshawa	102,876	48	1:2143	Feb. 1953
Ajax	19,659	6		March 1971
Newcastle	30,359	15		
Pickering	24,758	5		June 1971
Whitby	27,179	9		Dec. 1962
Uxbridge	10,517	6		
Other	19,117			
Regional Municipality (Durham)	234,465	89	1:2634	
Cornwall	45,743	12	1:3811	Jan. 1962
Alexandria	3,367	2		
Iroquois	1,223	1		
Maxville	864	1		
Morrisburg	2,148	3		
Winchester	1,083	3		
Other	42,273			
Stormont, Glengarry Dundas	96,701	20	1:4835	

¹ Source: Municipal Directory, 1976, Ministry of Treasury, Economics and Intergovernmental Affairs, Queen's Printer, Toronto, 1976

² Source: Ibid

³ Source: Ibid

⁴ Source: Ibid

TABLE 9

POPULATION AND SAMPLING PROPORTIONS FOR
FOUR STUDY AREAS IN ONTARIO SURVEY, 1977

Area	Population	Proportion ¹ Adults	Proportion ² Students
<u>York County</u>			
Metropolitan Toronto	2,152,269 (92%)	45%	33%
Rest of County	195,141 (8%)		
Total	2,347,410		
<u>Municipality of Durham</u>			
Oshawa	102,897 (44%)	22%	38%
Rest of County	131,589 (56%)		
Total	234,465		
<u>Stormont</u>			
Cornwall	45,743 (47%)	10%	14%
Rest of County	50,958 (53%)		
Total	96,701		
<u>District of Thunder Bay</u>			
Thunder Bay	108,571 (79%)	23%	20%
Rest of District	28,063 (21%)		
Total	136,634		

Source: Municipal Directory, 1976

1. The adult sample is based on 10 percent of the Metropolitan Toronto population and all of the municipal populations of Oshawa, Cornwall and Thunder Bay (i.e. 472,417).
2. The student sample is based on 10 percent of the population of York County and the whole population of the other three counties (702,541).

several young graduates have moved into the area and the city water supply has been fluoridated since 1962.

Table 8 provides more detailed information on the four study sites and their surrounding districts. Table 9 shows the sampling proportions for the adult's and children's/student's sample.

Children's and Student's Sample

As with the other countries in the ICS, the Ontario replication used the school system as its specific universe for the 8-9 year olds and the 13-14 year olds.

For both age groups schools were chosen randomly on the basis of metropolitan and non-metropolitan schools and public and separate schools.

Table 10 gives the breakdown between metropolitan and non-metropolitan respondents in the four study areas based on the school population.

TABLE 10

DISTRIBUTION BY NUMBER AND PERCENT BETWEEN
METROPOLITAN AND NON-METROPOLITAN RESPONDENTS
CHOSEN IN FOUR STUDY SITES FOR CHILDREN'S AND STUDENT'S SAMPLE

	Metropolitan		Non-Metropolitan		Total	
	No.	%	No.	%	No.	%
Toronto	391	92	33	8	424	100.0
Oshawa	181	44	231	56	412	100.0
Cornwall	83	47	93	53	176	100.0
Thunder Bay	198	79	53	21	251	100.0
Total Number ¹	853	68	410	32	1,263	100.0

¹ The total number (e.g. 853) means 853 Metropolitan students (13-14 years old) were chosen and 853 Metropolitan children (8-9 years old) were chosen.

TABLE 11

DISTRIBUTION BY NUMBER AND PERCENT OF ADULT RESPONDENTS
SAMPLED BY AGE GROUP FOR THE FOUR STUDY AREAS,
ONTARIO STUDY, 1977

	25 - 34 Year Olds		35 - 44 Year Olds	
	Sampled	Target	Sampled	Target
Toronto	428	270	595	450
Oshawa	176	132	284	220
Cornwall	82	60	132	100
Thunder Bay	186	138	340	230
Total	872	600	1 351	1,000

Adult Sample

The names of the 25-34 year olds and the 35-44 year old adults were chosen from the assessment rolls which the Ministry of Revenue made available to us on a confidential basis. A file was made of the population in each of these age groups for the four centres, and then a sample was chosen based on the sampling proportions in Table 9 and using a systematic random sampling technique. Each area was over-sampled by at least twenty-five percent to compensate for those who could not be contacted. The number of respondents chosen and the target sample are contained in Table 11. Because of the problems anticipated in getting cooperation from the adults based on Dr. Banting's experience in Stratford and Dr. Bonito's experience in Baltimore, it was decided to sample adults only within the city limits of the four centres. In addition, the address files available from the Ministry of Revenue often just give a rural route address for those outside the urban centre which makes contacting respondents difficult and time consuming.

Dentist Sample

The W.H.O. study design called for interviews of 100 dentists. The 100 dentists for the Ontario study were divided into the same proportions as the student sample. The target numbers were: Toronto 33; Oshawa 33; Cornwall 14; and Thunder Bay, 20.

In Toronto the dentist sample was chosen randomly from a list of those providers most frequently named by the student and adult respondents. In other centres, a random sample of dentists listed in the telephone book was used.

Hygienists's Sample

A sample of 101 hygienists was chosen from the most recent R.C.D.S. (Royal College of Dental Surgeons) membership list. Because Toronto has a much higher number of hygienists than the rest of the province, 75 hygienists were randomly selected from this area. From the other three sites the population of hygienists was chosen.: 14 in Oshawa, 3 in Cornwall and 9 in Thunder Bay.

The Instruments

In order to gather information about the relevant variables, the Ontario replication used the instruments designed by the W.H.O. These included an oral examination for the clinical data and an interview or questionnaire for the sociological information. Although the basic clinical information collected on the oral examination was the same as for the other countries, two additional questions were added: place of birth for all groups; and fluoride status for the 8-9 and 13-14 year olds.

As far as the sociological information, the questions were almost all pre-coded and set up so that no transferring from the questionnaire to code sheets would be necessary. Some of the wording was modified so that the questions were more appropriate for the Canadian dental system and Canadian culture. Table 12 provides a summary of the instruments used for each sample and the changes made for the Ontario replication.

TABLE 12
SUMMARY OF INSTRUMENTS AND
CHANGES MADE IN W.H.O. ORIGINAL INSTRUMENTS
BY SPECIFIC SAMPLE IN ONTARIO REPLICATION

Sample Group	Clinical Data	Sociological Data
8-9 year olds	Oral Examination Schedule, with the addition of place of birth and fluoride status	None
13-14 year olds	Same as 8-9 year olds	Student Questionnaire - self-administered
25-34 year olds	Oral Examination Schedule with addition of Country of birth	Adult Interview Schedule - with addition of SES information for both spouses, smoking information, and data concerning denturists
Dentists	None	Dentist Interview Schedule with addition of denturist data Economic Survey - self administered
Hygienists	None	Hygienist Interview Schedule - similar to dentist's

Oral Examination Schedule¹

This schedule is designed to collect a range of clinical data for each respondent. Some of the information is specific to each consumer group and other sections of the schedule are for all respondents. The first page lists a case number for each respondent. The first digit gives the location of the respondent's residence:

A	Toronto City	G	Durham Region
B	North York	H	Cornwall
C	East York	J	Stormont County
D	York	K	Thunder Bay
E	York Region	L	Thunder Bay District
F	Oshawa		

The second digit indicates the respondent's age group or discriminates providers from consumers:

- 1 8 and 9 year olds
- 2 13 and 14 year olds
- 3 25 to 34 year olds
- 4 35 to 44 year olds
- 5 Dentists
- 6 Hygienists

The next three numbers are merely sequential numbering of the respondents in each group. In addition the first page contains data concerning age, examiner, recorder, year of examination

¹See Appendix A

and place of birth.

On the next page of the oral examination form the number of deciduous and permanent teeth present are noted. Measures are taken on specified permanent teeth in terms of debris and calculus. For periodontal disease a measurement is made of each permanent tooth in the mouth. Then an evaluation is made of the treatment required on the basis of the periodontal status.

The next section of the oral records the caries condition and treatment recommended for every tooth in the mouth. Both permanent and deciduous teeth are scored. For the 13 and 14 year old group only an orthodontic assessment was done including an evaluation as to the treatment required and the treatment status of each respondent.

For all groups except the 8-9 year olds, information regarding prosthetic status was recorded including denture possession and requirement, the location of partial denture units, bridge possession and requirement and location of bridge units. The last two sections of the oral were completed by all age groups: oral pathology conditions and treatment required; and any condition in general needing immediate attention.

For the children and students a variable denoting fluoride status was added at the end of the schedule. For children this variable noted whether they were born in a fluoride area or not. For students the categories included where they were born and where they spent the first five years of their life.

Adult Interview Schedule¹

The International Collaborative Study used face-to-face interviewing as opposed to a mailed questionnaire. The Ontario replication used the same procedures with minor changes to the format of the interview schedule, as follows:

1. For each question there had to be an answer circled by the interviewer even if the answer was NA (not applicable).
2. Some of the wording was changed to make it more relevant to the Ontario dental system and the general culture of Ontario.

The questions used in the interview were designed to operationalize the concepts put forth in the theoretical framework developed by the W.H.O. The following sections describe these variables under antecedent and independent. Data concerning the dependent variable, oral health status, is found in the oral examination schedule.

Antecedent Variables

Socioeconomic

1. Age
2. Sex
3. Area of Residence
4. Years spent in Canada
5. Years spent in study site
6. Marital status
7. Socioeconomic status (Education, Occupation, SES for both male and female partners)

¹See Appendix A

8. Income - Total family income
Percent earned by respondent
Benefits received
Changes in income

9. Size of household

Past General Health Actions

1. Use of Health Providers

Perception of Health

1. Perceived Susceptibility to Dental Conditions
bleeding gums, broken tooth, toothache, tooth decay.
2. Perceived Susceptibility to Non-Dental Conditions
loss of hearing, high blood pressure, stomach ulcers,
overweight
3. Perceived Preventability of Dental Conditions
4. Perceived Preventability of Non-Dental Conditions
5. Perceived Mutability of Dental Conditions
6. Perceived Mutability of Non-Dental Conditions
7. Perceived Severity of Dental Conditions
8. Satisfaction
general health, gums, teeth

Past Dental Health Actions

1. Personal Dental Health Behaviour
gum massage, mouthwash, dental floss, brushing,
disclosing tablet, rinsing, toothpick, water spray

2. Fluoride Use

toothpaste, treatments

Tendency to Use Dental Practitioners
for Perceived Conditions

1. Conditions

swelling on the cheek, broken tooth, sore on gums,
sore on inside of mouth, bad breath, bleeding gums,
toothache

2. Tendency to Use Dentist for Perceived Conditions

Independent

Perceptions of Dental Health Needs

1. Perceived Conditions in the Last 12 Months
2. Reasons For (or for not) Visiting Dentist
3. Present Needs for Dental Treatment

restorative, periodontal, prosthetic

Utilization

1. Number of visits in the Last 12 Months
2. Years Elapsed Since Last Visit
3. User Type

Student Questionnaire¹

The Student Questionnaire was administered in the classroom with the respondents filling out the questionnaire themselves. The Ontario replication used the same procedures as the international study with minor changes to the format. The questions have been divided into antecedent and independent with the dependent variable data coming from the oral examination schedule.

Antecedent Variables

Socioeconomic

1. Age
2. Sex
3. Area of Residence
4. Birthplace
5. Principal Residence to Age 5
6. Proportion of Life Spent in this Country
7. Siblings - number and sex
8. Educational Achievement

Past General Health Actions

1. Visits to Physicians and Nurses

Perception of Dental Health

1. Satisfaction with Gums and Teeth

¹ See Appendix C

Past Dental Health Actions

Personal Dental Behaviour

1. Personal Dental Care

toothbrushing, toothpick, floss, disclosing tablet,
mouthwash, rinse, water spray, plaque light

2. Number of Snacks Between Meals

3. Use of Fluoride Toothpaste

4. Toothbrushing Behaviour (when teeth are brushed)

Tendency to Use Practitioners for Perceived Conditions

1. Conditions and visits

Independent Variables

Perception of Dental Health Needs

1. Perceived conditions in the last 12 months

2. Reasons for last visit

3. Decider of need to visit dentist

4. Reason for not visiting dental practitioner

5. Present need for treatment

Perceived Availability

1. Perceived Availability of Dentist

Accessibility (perceived and actual)

1. Economic

Perceived Economic Accessibility

Estimated Cost of Transportation

2. Time

Perceived Temporal Accessibility

Actual Time Spent

3. Distance

Perceived Spatial Accessibility

Actual Spatial Accessibility

Travel Mode

Travel Time to Dentist

Acceptability

1. Perception of Providers

Dentist - patient relationship

sensitivity to patient

competence of dentist

2. Status of dentist

3. Preventive Orientation to Dentistry

4. Aesthetic value of dental conditions

5. Knowledge of dental care measures

Reported lack of information

6. Pain avoidance

Utilization

1. User types
2. Place of last visit
3. Types of services received at last visit

Diagnostic, curative, preventive, orthodontic

Summary

This section has described the rationale and specifics of the sampling frame used in the Ontario replication of the International Collaborative Study. In addition, this chapter described the operational definitions of the major variables used in this study.

The next chapter will review the techniques used in the field and some of the problems encountered.

CHAPTER THREE

FIELD TECHNIQUES

Introduction

This chapter will review the organization, procedures, and administrative tools that were used to prepare the staff for the field work and to carry out the task of data gathering. The first section of this chapter will deal with training. If it is true that data are only as good as those who gather it then the importance of adequate training cannot be over-emphasized.

Training

Dental Examiners

One advantage that the ICS had over other large scale dental surveys is that one person, Dr. David Barmes, Chief of Oral Health for the WHO trained the examiners according to a set of very specific criteria. For the Ontario replication, Dr. Barmes was also able to train the examiners. This training consisted of two parts. First, Dr. Barmes worked exclusively with Dr. A. M. Hunt of the University of Toronto, and Dr. J. Stamm of McGill University, as they were to be the Chief Epidemiologists for the Ontario and Quebec replications. When Dr. Barmes was satisfied that the examining techniques and judgements of Drs. Hunt and Stamm met the WHO criteria, the other examiners were brought in. These included three dentists for the Quebec study and five for the Ontario study. Three of the five for the latter study were the main examiners and the other two were trained in case of illness or emergency replacement.

The training of the examiners consisted of rigorous calibration sessions. Approximately one hundred and sixty patients of varying ages and dental conditions were examined during a one week period. Several dentists would examine a patient and their results would be compared with Dr. Barmes', Dr. Hunt's or Dr. Stamm's results. In this way, tight control was kept over examination criteria and gradually the discrepancies between individual dentists narrowed. When Dr. Barmes was satisfied that the examiners were standardized, the sessions ended. From this point on, it was the responsibility of the Chief Epidemiologist to maintain and check the standards of his examiners. This was carried out by Dr. Hunt's checking every tenth student respondent and comparing the results with the other examiners.

Interviewers

The interviewers had to be trained not only in interviewing techniques but also in recording procedures for the dental examinations. In the Toronto study the interviewers and recorders were trained as separate entities. However, as the field work progressed it became obvious that the field staff needed to be skilled in both instruments. For the next areas the interviewer learned how to record as well as interview and this proved to be a superior use of manpower.

A two day training session was held in each site to familiarize the staff with the instruments and administrative procedures. At the beginning of the session the interviewers were given a training packet consisting of a version of NORC interviewers' manual adapted for the dental study, a copy of the adult interview schedule, and a copy of

the oral examination form. After an unfortunate experience in Thunder Bay with the interviewer material not reaching the interviewers until after the training session, mailing the kits was discontinued.

The first day of the training session, the research staff dissected the questionnaire question by question highlighting possible problems and questions which might arise. In addition, some techniques for interviewing were reviewed stressing value-free delivery and making the respondent feel comfortable. The interviewers were asked to interview a spouse or friend and then return the next day to review problems. The second day the interview schedule was again discussed question by question and the administrative procedures introduced.

Each interviewer was given 15 to 20 consecutive Contact Record Sheets listing case number, respondent's name, address and telephone number (if available). The interviewers were asked to contact each respondent on their list and attempt to make an appointment. In order to be prepared for unanticipated problems, the interviewers divided themselves into groups with the understanding that the group members could cover for each other in the event of illness or other eventualities.

The oral examination form was reviewed in a very superficial way at the training session as the real instruction had to wait for the arrival of the examiners. Usually the Sunday night before the first day of field work the interviewers would come in groups at half hour intervals to view some examinations and learn how to record. This seemed to be very satisfactory teaching technique and the interviewers learned the following:

1. Elementary knowledge of the oral cavity, including the convention for numbering teeth, the meaning of debris, calculus and

periodontal disease, coding caries condition and treatment and prosthetic status.

2. Consistencies necessary within the oral data, including:

- a) no more than 20 deciduous teeth or 32 permanent teeth were counted,
- b) if a tooth was missing on the debris index it must also be missing on the calculus index and vice-versa,
- c) the number of teeth in the caries index must correspond to the number of teeth counted,
- d) if a tooth is missing or if it is not a permanent tooth in the caries index, then it must be missing in the periodontal index.
- e) if a permanent tooth is missing and some prosthetic device is required, it must be in the same position as the missing tooth.

Pretest

In order to test the logistics of the examination and interview procedure, a pretest was held the week of March 21, 1977, with Monday, March 21 and Wednesday, March 23 allotted for interviews and oral examinations. Thirty respondents between the ages of 25 and 44 were randomly selected from the assessment rolls in the Borough of East York. Letters were sent to the respondents and then they were contacted by telephone and asked to appear at the dental school for an examination and an interview.

TABLE 13

STATUS OF RESPONDENTS SELECTED
FOR PRETEST, EAST YORK, MARCH 1977

	No.	%
Refused	2	6.67
Could not be located	3	10.00
Could not make appointment in time allowed	2	6.67
Did not keep appointment	4	13.33
Interview <u>only</u> completed	2	6.67
Oral <u>and</u> interview completed	17	56.67
Total respondents selected	30	100.00

Respondents were generally cooperative, although followup was necessary. From the 30 respondents chosen, two refused, four did not keep their appointment and three could not be located. For the respondents who failed to keep their appointments subsequent contacts could not be made because of time constraints. Had time permitted it was felt that 24 of the 30 respondents chosen would have participated in the study. From the pretest the following was learned:

1. respondents will come to a central examination centre;
2. assessment rolls are not up-to-date; thus, some respondents will be difficult to locate;
3. home visits will be necessary for those with unpublished numbers or those who share a phone;
4. all appointments have to be confirmed the day of or day before the actual appointment.

Field Procedures

Hiring Interviewers

Although there would have been advantages to having the same set of interviewers work throughout the study in that consistency would be maintained, it was impossible to find a large number of people who could commit themselves to the travelling time. In addition the costs of transporting and billeting a large team across the province would have been high. For these reasons a new set of interviewers was hired for each of our four locations.

It was found that a newspaper advertisement plus the assistance of the Health Department and Board of Education staff was usually enough to find suitable candidates. An advantage of hiring interviewers in each location is that they were familiar with the geography of the area and the attitudes and values of the residents. Often, they were more able to elicit co-operation than outside interviewers would have been.

Hiring decisions were made on the basis of initiative, enthusiasm and a pleasant manner as opposed to specific interviewing experience. It was found that when the aforementioned qualities were present interviewing skills were learned very quickly.

On Site Arrangements

Prior to the arrival of the entire research team it was necessary for an advance party to visit the community to investigate accommodation alternatives and set up a central examination centre. It was found that it was worth the extra expense to stay in a very good accommodation, as the morale of the team suffers if they have to stay in spartan surroundings for an extended period of time.

As for transportation, it was found necessary to have at least two cars available for the team. This was no problem when the centres were within commuting distance from the team's homes, but for other centres a full-size four door car was rented to transport the team and the equipment.

In order to introduce the study to the community, contacts were made with the local radio and television stations and the community newspapers. The media coverage was planned to coincide with respondents receiving their letters and the interviewers calling to arrange appointments.

A telephone was installed in the central examination centre and covered 9 a.m. to 9 p.m. during the field work so that respondents and interviewers would have some way to contact each other and the rest of the research team.

The central examination centres were found through the assistance of the Dental Officers of Health. In Thunder Bay and Cornwall, a church hall was used and in Toronto, the Faculty of Dentistry was used. In the first three locations the project rented the premises for a specified length of time.

Timetabling and Scheduling

From the experience in the four Ontario centres, the best strategy seems to be to do schools in the morning or if the full day is used, 13-14 year olds in the morning and 8-9 year olds in the afternoon. Adult appointments were scheduled at the central examination centre from 9 a.m. to 9 p.m. Monday to Friday and from 9 a.m. to 6 p.m.

on Saturday. Two dentists went to each school and it was found that one dentist could usually handle the adults unless there was an unusually large number of appointments. (e.g. the first day in Thunder Bay, 75 adult examinations were done).

Another factor which had to be considered was home visits. Usually one dentist was assigned home visits for the day and a route and schedule were worked out by the supervisory staff.

It was attempted to schedule the dentists so that they rotated between schools and adults and alternated between working evenings or not. This seemed to assist in keeping morale high and ensuring that the dentists saw a variety of cases.

To determine the length of time needed in an area we found that with 20 interviewers, a week for every 100 respondents was adequate. The interviewers were not on a schedule; they worked as little or as much as they wanted to. However, in essence, their work was controlled in that they had a set number of respondents for whom they were responsible and a set time period to contact them.

Contacting Respondents

Children and Students

Arrangements for sampling children and students were first made through the respective Medical and Dental Officers of Health for each of the study sites. Then the Directors of Education were either contacted directly by the project or through the Dental Officer of Health to get Board approval for the study. In some areas a special research application

form had to be completed before permission was granted. Once the Board approved, as was mentioned previously, a random sample of schools was chosen based on the proportion of public and separate school students in the area and in the case of Cornwall, French-speaking and English-speaking schools. Once the schools were chosen, the individual principals were contacted and a date for the study team to come to the school was arranged. Because the 13 and 14 year olds tended to have a short afternoon, they were scheduled for the morning and the 8 and 9 year olds for the afternoon. A classroom from each school in the relevant age group was chosen, assuring approximately 30 students in a class. An over-sample of 20 percent was included in the framework to account for absentees, over and under age pupils and those whose parents would not allow them to participate. Letters to explain the project and forms¹ for permission to participate were sent to the parents usually from the study headquarters but sometimes through the local school board or health board. In addition, after the examination the pupils were given a statement of dental defects to be taken home to their parents indicating in general the state of their dental health. A local telephone number was included so that parents could get more information about their child's status if they required it. In the City of Toronto the Health Department sent out these notices but in all other areas the research team was responsible for their distribution.

As for the logistics of the school visits, two dentists, two recorders and a supervisor were sent to each school. The supervisor was responsible for confirming the date and time of arrival of the team with

¹ See Appendix Exhibits and

the school authorities, meeting with the teacher, assigning case numbers to the students, collecting permission forms, and ensuring that the movement of the pupils from the classroom to the examination centre was orderly and caused as little disruption to normal activities as possible. The two dentists, assisted by the recorders, conducted the examination usually in a nurse's room or staff room where a sink and electrical outlets were available. Portable dental chairs were brought by the team in order to facilitate the examination. Two dentists could examine 30 pupils very easily in a morning session and in some circumstances up to sixty were done in a half day.

Adults

Once the sample was chosen letters¹ were sent to each of the respondents on the Faculty of Dentistry letterhead describing the study and what their participation would entail. In addition, the letter stated that respondents who came to the central examination centre for an interview would receive \$5.00 to cover the cost of their transportation and other out-of-pocket expenses. After the letters were sent, the interviewers attempted to contact each respondent by telephone and to make an appointment for the examination and the interview. Those who could not arrange to visit the central examination centre were offered home appointments. In the Toronto phase one-third of the interviews were done in the home. However, in the other centres over ninety percent of respondents came to the centre. For those respondents for whom no telephone number could be

¹ See Appendix

found, another letter was delivered to the respondent asking the respondent to call the central examination centre.

Providers

In order to elicit the co-operation of the area dentists, the President of the local dental society was contacted either directly or through the offices of the Dental Officer of Health. In one centre a member of the study team went to speak at a dental society meeting to outline the purpose of the study. Each dentist in the sample received a personal letter giving the details of the study and soliciting his or her co-operation. Subsequently, each dentist was contacted by an interviewer and arrangements were made for an interview.

The hygienists were also sent personal letters. Many of them were already aware of the study through the dentists with whom they worked.

Maintaining Control

Introduction

One of the keys to having a successful field work phase would seem to be the introduction of control mechanisms for both the field team and the respondents. The dangers inherent in having a large staff dealing with many subjects include:

1. the interviewers avoiding the more disagreeable aspects of field work; e.g., telephoning and tracking down respondents, in favour of the less frustrating tasks such as coding and keypunching;

2. having interviewers not follow-up on their respondents resulting in a lack of continuity;
3. mismatching of case numbers and names;
4. misplacing interviews and oral examinations;
5. not having a dentist or interviewer available for a respondent;
6. the inability to identify easily the outcome for every respondent in the sample after the field work is completed;
7. the inability to complete the interviews properly because of a language or comprehension problem;
8. the interviewers "cooking" the data instead of really interviewing the respondent; and
9. lack of control in the classroom when the students answer the student questionnaire.

Control of Respondents

Several administrative tools¹ were developed to assist in keeping track of respondents. The first was the "Contact Record Form." These sheets listed the case number, the name, the address and the telephone number (if available) for each respondent in the sample for that particular study site. They were used by the interviewer to record the date, time and nature of any contacts with the respondent. In this way, the sheets served as a reminder to the interviewer as to when the respondent should be contacted again, and it also served as a record of the nature of the interactions with the respondent so that if a case was passed on to another interviewer, there was some background available on the respondent.

¹ See Appendix F for all the relevant forms.

In order to have a quick reference as to the status of each respondent; that is, completion, partial completion or refusal, a "Final Status Form" was developed. This form had the name, address, case number and outcome for each respondent. The "Non-Interview Report Form" explains why the respondent did not participate in the study. Often respondents who received letters would call the examination centre to get further information or to make an appointment. Since respondents were identified by number only it was necessary to have an alphabetical listing of respondents so that their request could be referred to the appropriate interviewer. In order to know where a questionnaire or oral examination form was at any time, interviewers were asked to mark off EA, QA, for completions beside the appropriate case number. When these documents were out of the office filing cabinets for coding, the letters were EB, QB; when back, EC, QC, when out for keypunching, ED, QD, when back, EE, QE. A box was provided for completed questionnaires and orals. Once coding was completed all questionnaires and orals were filed in a locked filing cabinet in case number order.

Another way control was maintained was that all appointments and arrangements for home visits were booked through the research assistant and logged into the master appointment book. This way, arrangements could be made to have enough dentists available for peak appointment times.

Arrangements for school child examinations were made many weeks in advance. On the day of the examinations at a particular school, a class list was obtained and a case number was assigned to each student present. The case list formed a permanent record for future referral

if parents made inquiries about their child's dental health. It also provided an ongoing record of the number of children examined.

One staff member acted as a supervisor to ensure that the pupils moved to the examination room at the appropriate time and that the 13 and 14 year olds filled out the questionnaire in an orderly fashion.

Control of Staff

In order to ensure that interviewers were spending an appropriate length of time on the telephone, each interviewer was given the same number of respondents for whom they were responsible. During the first week of field work the Contact Record Forms were surveyed by the supervisory staff and re-allocations were made on the basis of work completed.

To assist in correcting any errors or omissions, the examiner, the interviewer and the recorder were identified for each completed respondent. The first few interviews and oral were checked to ensure that they were being filled out properly and to correct any misconceptions that might exist. Because most of the interviews were done in the examination centre with several of the supervisory staff there at all times, it was virtually impossible to "cook" the results.

Problems in the Field

Despite the time spent in advance planning and organizing the study there were certain problems that were encountered in each site. Some of the major ones are listed in this section.

Oshawa

1. Being a company town for General Motors many of the respondents were working shifts and overtime which limited the time they had available to participate in the study.
2. Many of the Oshawa residents worked in Toronto and the commuters were less interested in giving up any of their evening hours.
3. Because of the policies of the Board of Education, a sizeable number of students were overage for their grade. This necessitated choosing another subsample of schools to reach the target sample.

Cornwall

1. A number of adults were shift workers in the pulp and paper industry which limited their time available.
2. In the two week period, January 9 to January 20 there were three major blizzards in Cornwall, with accumulations of 30 inches of snow. Schools were closed for two days and respondents, interviewers and the survey team found it extremely difficult and at times, hazardous to travel around the city. The effect of the weather could be seen in the high number of missed and cancelled appointments. The first day it was over 50 percent and in all other centres it had been 25 percent.

Thunder Bay

1. Thunder Bay is also a company town with a sizeable number of shift workers. In addition many of the men work in the bush during the week and were unavailable for the study.

Toronto

1. For the adult sample, the assessment rolls were found to be badly out of date. One of the major contributing factors is that Toronto is a very transient city with large numbers of people moving into, out of and around the city within a year.
2. Toronto has a very large ethnic population. There are about 700,000 people of Italian extraction within the city. This created massive problems in interviewing as so many respondents could not speak English. Although three interviewers did all the Portuguese and Italian interviews between them, most of them were home visits which slowed down the field proceedings.
3. Toronto is also geographically a huge city and on a number of occasions the team found it almost impossible to meet their appointment times for home interviews. One accident on Highway 401 put the team an hour and a half behind schedule one night.
4. Toronto, more than any other study site, had a sizeable number of unlisted telephone numbers. This necessitated visiting homes to try to make contact.
5. Because it is the industrial and financial centre of Ontario, a higher proportion of females work outside the home. This meant that contacting respondents was more limited to the evening hours and weekends. Since the field work was carried out in May and June, people were often not home in the evening and on weekends, and also less willing to give up their free time in the nice weather to participate in the study.

Response Rate

The problems in the field are reflected in the response rates for adults for each of the study sites as found in Table 14. For example, Toronto had a much higher proportion of "out of sample" than did the other areas because of the transient nature of a large urban centre. On the other hand, Cornwall had the highest number of non-respondents probably because of the treacherous weather conditions during the team's two week stay in Eastern Ontario. For students, (Table 15) the reason the Thunder Bay sample is so low is that the classes were smaller than anticipated and a number of students were overaged or underaged.

In Cornwall, more students were sampled than necessary because a slightly different sampling form had to be used to take into account not only public and separate schools, but also French-speaking and English-speaking schools. Thus, the sampling frame might be 27 in the class. The policy of the team had been to do the whole class so this was continued in Cornwall.

For Children, (Table 15) each of the study sites exceeded the target number.

Summary

This concludes the section of the report on the design and execution of the Ontario replication of the International Collaborative Study. The next part deals with the findings related to the oral health status of the various age groups in the Ontario population.

TABLE 14

RESULTS OF FIELD WORK FOR ADULT SAMPLE
25 - 44 YEARS OLD BY STUDY SITE, ONTARIO
SAMPLE, 1977

	TORONTO	OSHAWA	CORNWALL	THUNDER BAY
Sample selected ¹	1,023	460	214	526
Target sample	720	352	160	368
Out of sample	25.9%	11.1%	18.2%	19.6%
Unable to contact	226	51	23	50
Temporarily away	31	3	7	25
Moved	3	17	7	22
Under or over age	5	4	2	6
Total	265	75	39	103
Non-Respondents	25.0%	19.6%	28.5%	20.9%
Refusal	202	64	34	66
App't not kept	46	23	24	40
Unable to make app't	6	3	4	4
Language barrier	12	-	1	-
Total	256	90	61	110
Effective sample ²	758	385	175	423
No. of Respondents	502	295	112	313
Response Rate ³	66.3%	76.6%	64.0%	74.0%
Respondents excluded ⁴	35	29	9	6
Final No. of Respondents	467	266	103	307
Final Response Rate ⁵	64.6%	74.7%	62.0%	73.6%

1. "Sample selected" is at least 25 percent more than the "target sample" to compensate for the expected number of "out of sample".

2. "Effective sample" is the "sample selected" minus the "out of sample".

3. "Response Rate" is based on "No. of Respondents" over "effective sample".

4. "Respondents excluded" includes those identified by the cleaning programme as being over age, underage, duplicates or having no oral or interview completed.

5. "Final response rate" is based on the "final number of respondents" over "effective sample" minus exclusions.

TABLE 15

RESULTS OF FIELD WORK FOR CHILDREN'S (8-9 YEAR OLDS) AND
STUDENT SAMPLE (13-14 YEAR OLDS)
BY STUDY SITE, ONTARIO SAMPLE 1977

	Toronto	Oshawa	Cornwall	Thunder Bay
Students				
Sample Selected ¹	414	414	176	251
Target Sample ²	330	330	140	200
No. of Respondents ³	292	335	188	121
Total Respondents (936)				
Children				
Sample Selected	414	414	176	251
Target Sample	330	330	140	200
No. of Respondents	361	370	168	225
Total Respondents (1124)				

¹ This is an approximate figure only as it depended on the actual size of the classes.

² This is based on the proportions listed in Table 14.

³ This number excludes those underaged or overaged.

PART III THE ORAL HEALTH STATUS OF THE ONTARIO SAMPLE

CHAPTER ONE

INTRA - SAMPLE COMPARISON OF CHILDREN

Background

As was mentioned in the section of the report dealing with the methodology and research design for the Ontario replication, a sampling frame was developed using the four Ontario centres; Toronto, Oshawa, Cornwall and Thunder Bay, such that a target sample of 1,000 eight and nine year old children would be examined. In practice, the actual sample was 1,124 (Table 15). In addition, Table 15 indicates the proportion of the sample chosen from each of the sampling areas, and Table 16 lists the number of schools visited in each area.

TABLE 15

DISTRIBUTION BY NUMBER AND PERCENT OF CHILDREN EXAMINED
BY SAMPLING AREA, ONTARIO SAMPLE, 1977

Area	N	%
Toronto	332	29.5
York County	29	2.6
Oshawa	182	16.2
Durham Region	188	16.7
Cornwall	76	6.8
Stormont County	92	8.2
Thunder Bay	176	15.7
Thunder Bay District	49	4.4
Total	1,124	100.1 ¹

¹Rounding error

TABLE 16

DISTRIBUTION BY NUMBER AND PERCENT OF SCHOOLS VISITED
BY SAMPLING AREA, ONTARIO SAMPLE, 1977

<u>Area</u>	<u>N</u>	<u>%</u>
Toronto	14	32.6
York County	2	4.6
Oshawa	6	14.0
Durham Region	5	11.6
Cornwall	3	7.0
Stormont County	4	9.3
Thunder Bay	6	14.0
Thunder Bay District	3	7.0
Total	43	100.1 ¹

¹Rounding error

Four dental examiners were involved in the clinical aspect of the study. Dr. A. M. Hunt also acted as the Chief Epidemiologist; and was thus, responsible for ensuring that the examiners remained standardized. Two additional dentists participated in the calibration sessions so that an examiner would be available in the event of illness. The breakdown of the number of examinations performed on the 8 - 9 year old children's sample is presented in Table 17.

TABLE 17

DISTRIBUTION BY NUMBER AND PERCENT OF EXAMINATIONS COMPLETED
FOR CHILDREN BY EXAMINER, ONTARIO SAMPLE, 1977

<u>Examiner</u>	<u>N</u>	<u>%</u>
Hunt	542	48.2
Hausmanis	169	15.0
Krupanszky	287	25.5
Reiha	97	8.6
Ambrozaitis	0	0.0
Ellis	29	2.6
Total	1,124	99.9 ¹

¹Rounding error

In terms of the general characteristics of the children's sample, 574 (51.1%) were males and 550 (48.9%) were females. Seven hundred and sixty-six (68.1%) resided in a metropolitan area, and 358 (31.9%) lived in a non-metropolitan area. As for exposure to a fluoridated water supply, 516 (45.9%) were born in a fluoride area, 424 (37.7%) were not, and the remaining 184 (16.4%) could not provide the required information.

The next sections of the chapter will review the results of the oral examination in general and then, comparisons will be made among the subgroups of the sample.

Oral Morbidity in the Total Sample

In terms of tooth development, the eight and nine year olds have a mixed dentition; that is, some deciduous teeth, and some fully and partially erupted permanent teeth are present. Because both types of teeth are relevant for evaluating the oral health status of the children's sample the findings will be presented for both deciduous and permanent teeth.

Table 18 gives the major findings for deciduous teeth. The children had a mean of 9.84 deciduous teeth still present in the mouth. Of these, an average of 7.01 were sound, 0.97 were decayed, 1.64 were successfully filled, 0.20 filled but needed further care and 0.26 missing due to caries for an average dmf of 3.07.

Table 19 presents the findings related to the oral health status of the permanent dentition in the children's sample. At 8 or 9 years of age the children had an average of 13.11 permanent teeth present. A mean of 11.56 were sound, while 1.55 were either decayed, missing or filled. As for the DMF teeth, an average of 0.64 were decayed, 0.83 were successfully filled, 0.06 were filled but redecayed and 0.04 were missing due to caries.

As one of the important factors that affects dental health status is oral hygiene, several measures of this variable were included in this study. An average of 3.75 teeth per child was affected by gingivitis. The average score on the debris index was 0.94; and for the calculus index, 0.02 per tooth. The Oral Hygiene Index incorporated

DETAILED STATISTICS FOR ORAL MORBIDITY MEASURES ON DECIDUOUS TEETH
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

(N = 1,124)

Variable Name	Central Tendency ¹			Dispersion ²			Standard Error ³
	Mean	Median	Mode	S ²	SD	Range	
Number of teeth present	9.84	11.11	12.00	11.49	3.39	19.00	0.10
Number of sound teeth	7.01	7.21	12.00	15.51	3.94	18.00	0.12
Number of teeth affected by caries (dmf)	3.07	2.61	0.00	7.94	2.82	12.00	0.08
Number of decayed teeth	0.97	0.29	0.00	3.05	1.74	12.00	0.05
Number of successfully filled teeth	1.64	0.61	0.00	4.51	2.12	9.00	0.06
Number of filled teeth needing further care	0.20	0.08	0.00	0.42	0.65	8.00	0.02
Number of teeth missing	0.26	0.05	0.00	0.97	0.99	10.00	0.03

¹Measures of Central Tendency:

The "Mean" is the average value; that is, the sum of individual values for each case divided by the number of cases.

The "Median" is the numerical value of the middle case or the case lying exactly on the 50th percentile, once all the cases have been ranked from the highest to lowest.

The "Mode" is the value of the variable which occurs most often.

²Measures of Dispersion

"S² or Variance" is a measure of dispersion of the data about the mean of an interval level variable.

"SD or Standard Deviation" is the square root of the variance.

The "Range" is the minimum value for the variable subtracted from the maximum.

³The "Standard Error" helps to determine the potential degree of discrepancy between the sample mean and the unknown population mean; that is, it is a confidence interval.

TABLE 19

DETAILED STATISTICS FOR ORAL MORBIDITY MEASURES
ON PERMANENT TEETH FOR 8 - 9 YEAR OLDS,

ONTARIO SAMPLE, 1977
(N = 1,124)

Variable Name	Central Tendency			Dispersion			Standard Error
	Mean	Median	Mode	S ²	SD	Range	
Number of teeth present	13.11	12.18	12.00	10.93	3.31	26.00	0.10
Number of sound teeth	11.56	11.42	12.00	10.20	3.20	25.00	0.10
Number of teeth affected by caries (DMF)	1.55	1.12	0.00	2.63	1.62	7.00	0.05
Number of decayed teeth	0.64	0.24	0.00	1.33	1.15	7.00	0.03
Number of successfully filled teeth	0.83	0.29	0.00	1.67	1.30	6.00	0.04
Number of filled teeth needing further care	0.06	0.02	0.00	0.07	0.27	2.00	0.01
Number of missing teeth	0.04	0.01	0.00	0.10	0.31	5.00	0.01
Number of teeth with gingivitis	3.75	3.03	0.00	11.13	3.34	18.00	0.10
Debris index	0.94	0.84	0.83	0.23	0.48	2.70	0.01
Calculus index	0.02	0.00	0.00	0.01	0.12	1.33	0.00
Oral hygiene index	0.96	0.83	0.83	0.27	0.52	3.67	0.02
Periodontal index	0.31	0.25	0.00	0.08	0.28	1.67	0.01
Modified periodontal index	0.31	0.25	0.00	0.08	0.28	1.67	0.01

debris and calculus in its measure, but for children the average calculus score is negligible. Thus, the oral hygiene score was only 0.96 for this age group. Because of the low gingivitis score the average score on the periodontal index was also low at 0.31.

Another aspect of oral health status which is relevant for evaluating the system for delivery of dental care is the treatment needs. These needs are important in determining the quantity and type of manpower required to service the population. In terms of the treatment requirements for the 8 - 9 year olds, Table 20 describes the needs for both permanent and primary teeth. An average of 1.59 teeth per child needed some treatment of which 1.39 required restoration and 0.20 required extraction.

Another way of examining the treatment needs is to look at the percentage of decayed, missing and filled teeth for deciduous and permanent dentition. Table 21 indicates that 56.7 percent have no decayed deciduous teeth; and thus, no treatment need for that dentition while 66.4 percent have no decayed permanent teeth; and thus, no treatment need for that dentition (Table 22). When one investigates the treatment needs of permanent and deciduous teeth together, 48.8 percent of children have no treatment requirements at all (Table 23).

The distribution of the sample on various oral hygiene and periodontal indices is shown in Table 24. On every measure of periodontal health, the children have low scores.

TABLE 21

DISTRIBUTION BY NUMBER AND PERCENT OF
DECAYED, MISSING AND FILLED DECIDUOUS TEETH FOR 8 - 9 YEAR OLDS,
ONTARIO SAMPLE, 1977

Number of Teeth	Decayed ¹		Missing ²		Filled ³		dmf (deciduous) ⁴	
	N	%	N	%	N	%	N	%
0	637	56.7	1,018	90.6	547	48.7	301	26.8
1	179	15.9	38	3.4	136	12.1	127	11.3
2	104	9.3	22	2.0	118	10.5	121	10.8
3	74	6.6	16	1.4	94	8.4	124	11.0
4	50	4.4	12	1.1	90	8.0	116	10.3
5	34	3.0	7	0.6	55	4.9	90	8.0
6+	46	4.1	11	1.0	84	7.4	245	21.8
Total	1,124	100.0	1,124	100.0	1,124	100.0	1,124	100.0

1 "Decayed" includes teeth decayed and those filled or crowned with additional primary or secondary decay.

2 "Missing" includes teeth missing due to caries only.

3 "Filled" includes successfully filled or crowned teeth and requiring no further treatment.

4 "DMF" is Decayed + Missing + Filled. (dmf refers to deciduous teeth only, but has the same components).

TABLE 22

DISTRIBUTION BY NUMBER AND PERCENT OF
DECAYED, MISSING AND FILLED PERMANENT TEETH
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

Number of Teeth	Decayed		Missing		Filled		DMF (permanent)	
	N	%	N	%	N	%	N	%
0	746	66.4	1,100	97.9	708	63.0	441	39.2
1	174	15.5	14	1.2	142	12.6	194	17.3
2	96	8.5	5	0.4	118	10.5	171	15.2
3	55	4.9	2	0.2	74	6.6	124	11.0
4	41	3.6	2	0.2	75	6.7	156	13.9
5	7	0.6	1	0.1	6	0.5	27	2.4
6+	5	0.4	0	0.0	1	0.1	11	1.0
Total	1,124	100.0	1,124	100.0	1,124	100.0	1,124	100.0

TABLE 20

DETAILED STATISTICS OF TREATMENT NEED MEASURES
FOR PERMANENT AND DECIDUOUS TEETH, FOR 8 - 9 YEAR OLDS,
ONTARIO SAMPLE, 1977
(N = 1,124)

	Central Tendency			Dispersion		Standard Error
	Mean	Median	Mode	s^2	SD	
Number of teeth needing some treatment	1.59	0.56	0.00	5.67	2.38	0.07
Number of teeth needing restoration	1.39	0.51	0.00	4.11	2.02	0.06
Number of teeth needing extraction	0.20	0.06	0.00	0.51	0.72	0.02

TABLE 23

DISTRIBUTION BY NUMBER AND PERCENT OF DECIDUOUS AND PERMANENT TEETH
NEEDING ANY TREATMENT, RESTORATION AND EXTRACTION
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

Number of Teeth	Any Treatment		Restoration		Extraction	
	N	%	N	%	N	%
0	549	48.8	560	49.8	1,008	89.7
1	203	18.1	208	18.5	61	5.4
2	115	10.2	120	10.7	29	2.6
3	72	6.4	78	6.9	10	0.9
4	54	4.8	57	5.1	10	0.9
5	39	3.5	38	3.4	2	0.2
6	25	2.2	21	1.9	4	0.4
7	24	2.1	18	1.6	0	0.0
8	10	0.9	12	1.1	0	0.0
9	16	1.4	6	0.5	0	0.0
10+	17	1.6	6	0.5	0	0.0
Total	1,124	100.0	1,124	100.0	1,124	100.0

TABLE 24

DISTRIBUTION BY NUMBER AND PERCENT OF SCORES ON
ORAL HYGIENE, DEBRIS, CALCULUS AND PERIODONTAL INDICES
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

Index ¹ Score	Oral Hygiene		Debris Index		Calculus Index		Periodontal Index	
	N	%	N	%	N	%	N	%
0.00 - 0.05	21	1.9	21	1.9	1,054	93.8	205	18.2
0.05 - 0.25	41	3.6	41	3.6	31	2.8	412	36.6
0.25 - 0.45	78	6.9	81	7.2	18	1.6	218	19.4
0.45 - 0.65	134	11.9	132	11.7	6	0.5	137	12.2
0.65 - 0.85	305	27.1	313	27.8	8	0.7	98	8.7
0.85 - 1.05	140	12.5	151	13.4	4	0.4	38	3.4
1.05 - 1.25	132	11.7	127	11.3	2	0.2	9	0.8
1.25 - 1.45	85	7.6	90	8.0	1	0.1	3	0.3
1.45 - 1.65	62	5.5	64	5.7	0	0.0	3	0.3
1.65 - 1.85	73	6.5	61	5.4	0	0.0	1	0.1
1.85 - 2.05	13	1.2	13	1.2	0	0.0	0	0.0
2.05+	40	3.6	30	2.7	0	0.0	0	0.0
Total	1,124	100.0	1,124	100.0	1,124	100.0	1,124	100.0

¹ Rounded limits are listed, but each class interval is mutually exclusive.

Differences in Oral Morbidity by Selected Characteristics

There are a number of factors which could be identified as having an impact on the oral health status of the 8-9 year old sample. Some of the more relevant ones include sex, location (i.e. metropolitan vs. non-metropolitan), study area (i.e., geographic location and economic status) and fluoride status. The oral morbidity measures will be discussed in terms of these characteristics in the following sections. As mentioned previously, because this age group had a mixed dentition, the measures are presented for both deciduous and permanent teeth.

Sex and Location

Description of Findings

Table 25 indicates that in terms of deciduous teeth, metropolitan children have slightly more teeth present than non-metropolitan children (9.94 vs. 9.62). When looking at sex differences it can be noted that the males in both metropolitan and non-metropolitan regions have at least one more deciduous tooth present than do the females. The difference by sex between the number of sound teeth present is less than one for the metropolitan group and the non-metropolitan group. For both locations the females have a lower dmf and a smaller number of teeth. According to Table 26 females have fewer teeth successfully filled than do males.

Tables 27 and 28 present the findings for permanent teeth. The non-metropolitan group had more permanent teeth present (13.31) than the metropolitan group (13.01). This conforms with the fact that the

metropolitan group has more deciduous teeth present. In terms of DMF there is virtually no difference between the metropolitan (1.54) and the non-metropolitan (1.55) or on any of the other oral morbidity measures.

In terms of sex differences the females in both metropolitan and non-metropolitan locations have at least one more permanent tooth present than do the males. The DMF for both areas is higher for females than for males. However, when one controls for the number of teeth present in the mouth, 12 percent of both metro males and females are D or M or F, 10 percent of non-metro males and 13 percent of non-metro females. Females in non-metro areas have more decayed teeth than males (0.72 vs. 0.53) but there is no real difference between the sexes in the metropolitan areas. Females in both locations have more successfully filled teeth than males.

Tables 29 and 30 present findings related to oral hygiene and periodontal disease. The metropolitan group appears to have slightly higher gingivitis, debris, oral hygiene and periodontal scores. However the differences are slight and all of the scores would be considered low.

On all measures the females have lower scores than the males regardless of metropolitan or non-metropolitan location. These findings may be attributed to tooth brushing and other oral hygiene measures, but as no such data were collected this is just speculation.

Table 31 presents the number of teeth requiring treatment in the 8-9 year old sample.

Females in non-metropolitan areas require more treatment than males. The major component in the treatment difference is the

restorations need for non-metro females vs. non-metro males (1.53 vs. 1.23). The treatment/need ratios are presented in Tables 32 and 33 for deciduous and permanent teeth respectively. There is virtually no difference on any of the indicators which could be interpreted to mean that the level and quality of treatment does not differ by sex and location.

Analysis of Differences
by Sex and Location

In order to evaluate whether the differences noted between the metropolitan and non-metropolitan samples and the males and the females on the various oral morbidity measures were significant or not, the student's t test was used.¹ It was found that for the metropolitan and non-metropolitan groups the only statistically significant differences were in the number of teeth with gingivitis, the debris index score and the oral hygiene index score. In all cases the metropolitan sample had higher scores than the non-metropolitan group. However, none of the differences in the measures for caries prevalence or for treatment required were significantly different.

In terms of differences between males and females, for the metropolitan group it was found that males had significantly more deciduous teeth and females had significantly more permanent teeth. Males had a significantly higher dmf and the differences from females seems to be accounted for by the higher number of successfully filled teeth. There were no other statistically significant differences in the dmf components between males and females.

¹ See H. Blalock, Social Statistics, McGraw Hill, Toronto, 1960, pgs. 169-179 for a description of this statistical test.

Although metro females have significantly more permanent teeth and permanent sound teeth than do their male counterparts, there are no differences in DMF or its components. The final difference in this metropolitan group was in the debris index with the males having significantly higher scores than the females.

In the non-metropolitan area the males have significantly more deciduous teeth present and significantly more sound teeth than do the females. The females have significantly more permanent teeth present, more sound teeth and a higher DMF than the males. The factor contributing to the higher DMF appears to be number of successfully filled teeth as none of the other differences on the caries measures are significant. In addition the males are significantly higher than the females in debris scores, oral hygiene scores and periodontal scores. In addition to student's t tests, analysis of variance was also carried out to test for the significance of differences between males and females and metropolitan children and non-metropolitan children on various oral morbidity measures. Tables 34 to 41 present the results from the analysis of variance.

For deciduous teeth it would appear that sex has a significant effect on number of teeth present, number of sound teeth, dmf, and successfully filled teeth. Location does not significantly affect any of the measures on deciduous teeth.

Tables 35 and 36 present the findings for permanent teeth. Sex is an important differentiating factor for all measures except number of decayed teeth, teeth filled and needing further care, missing teeth, and calculus index. Location only, affects gingivitis scores and the debris index.

In terms of treatment needed, as Table 37 indicates, there are no differences by sex and/or location.

As mentioned previously, the 8-9 year olds have mixed dentition. In addition, it should be noted that females have a higher number of permanent teeth because they develop earlier than males of the same age. This means that many of the oral morbidity measures would be related to the number of deciduous and permanent teeth present, and not directly to sex. Tables 38 to 41 examine the effect on the dependent variables when number of teeth is a covariate. For deciduous teeth, sex disappears as a significant factor and instead, number of teeth present is related to number of sound teeth, teeth successfully filled and teeth lost to caries.

For permanent teeth number of teeth present appears related to all measures but the calculus index and the periodontal and modified periodontal indices. Sex, however, is still a factor in gingivitis, debris, and oral hygiene. Location is a factor in gingivitis, oral hygiene, periodontal and modified periodontal indices.

As indicated in Table 41, number of teeth present is not a factor in the treatment needed.

TABLE 25

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES
FOR DECIDUOUS TEETH BY SEX AND LOCATION FOR 8 - 9 YEAR OLDS,

ONTARIO SAMPLE, 1977

Number of Deciduous Teeth:

	N	Present		Sound		Affected by Caries (dmf)		Decayed	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	1,124	9.84	3.39	7.01	3.94	3.07	2.82	0.97	1.74
Metropolitan	766	9.94	3.43	7.11	4.02	3.10	2.89	0.99	1.78
Metro Males	403	10.42	3.23	7.33	4.04	3.34	2.93	1.03	1.82
Metro Females	363	9.42	3.57	6.86	4.00	2.83	2.83	0.94	1.73
Non-Metropolitan	358	9.62	3.30	6.82	3.74	3.02	2.65	0.94	1.68
Non-Metro Males	171	10.44	3.01	7.50	3.61	3.14	2.69	1.01	1.69
Non-Metro Females	187	8.87	3.38	6.19	3.76	2.91	2.62	0.88	1.67

TABLE 26

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES
FOR DECIDUOUS TEETH BY SEX AND LOCATION FOR 8 - 9 YEAR OLDS ,

ONTARIO SAMPLE, 1977

Number of Deciduous Teeth:

	N	Successfully Filled		Filled Needing Further Care		Lost to Caries	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	1,124	1.64	2.12	0.20	0.65	0.26	0.98
Metropolitan	766	1.63	2.16	0.21	0.68	0.27	1.04
Metro Male	403	1.83	2.24	0.22	0.67	0.26	0.93
Metro Female	363	1.40	2.06	0.20	0.69	0.29	1.15
Non-Metropolitan	358	1.68	2.04	0.19	0.58	0.22	0.86
Non-Metro Male	171	1.77	2.13	0.17	0.50	0.20	0.80
Non-Metro Female	187	1.59	1.96	0.20	0.64	0.24	0.92

TABLE 27

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES
FOR PERMANENT TEETH BY SEX AND LOCATION FOR 8 - 9 YEAR OLDS ,

ONTARIO SAMPLE, 1977

Number of Permanent Teeth:

	N	Present		Sound		Affected by Caries (DMF)		Decayed	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	1,124	13.01	3.31	11.56	3.19	1.55	1.62	0.64	1.15
Metropolitan	766	13.01	3.31	11.47	3.19	1.54	1.63	0.65	1.14
Metro Males	403	12.47	3.10	10.98	2.91	1.49	1.63	0.66	1.18
Metro Females	363	13.61	3.43	12.01	3.39	1.61	1.63	0.64	1.10
Non-Metropolitan	358	13.31	3.29	11.77	3.21	1.55	1.60	0.63	1.18
Non-Metro Males	171	12.65	3.05	11.39	3.08	1.24	1.42	0.53	0.99
Non-Metro Females	187	13.91	3.40	12.12	3.29	1.83	1.71	0.72	1.32

TABLE 28

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES
FOR PERMANENT TEETH BY SEX AND LOCATION FOR 8 - 9 YEAR OLDS
ONTARIO SAMPLE, 1977

Number of Permanent Teeth:

	N	Successfully Filled		Filled Needing Further Care		Lost to Caries	
		X	SD	X	SD	X	SD
Total	1,124	0.83	1.29	0.06	0.27	0.04	0.31
Metropolitan	766	0.81	1.29	0.06	0.28	0.04	0.30
Metro Males	403	0.75	1.25	0.06	0.27	0.03	0.27
Metro Females	363	0.89	1.34	0.06	0.29	0.05	0.34
Non-Metropolitan	358	0.86	1.29	0.05	0.25	0.03	0.32
Non-Metro Males	171	0.69	1.16	0.03	0.20	0.00	0.08
Non-Metro Females	187	1.01	1.38	0.06	0.29	0.05	0.44

TABLE 29

MEANS AND STANDARD DEVIATIONS ON SELECTED ORAL MORBIDITY MEASURES
FOR PERMANENT TEETH BY SEX AND LOCATION FOR 8 - 9 YEAR OLDS,

ONTARIO SAMPLE, 1977

	N	No. of teeth with Gingivitis		Debris Index		Calculus Index	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	1,124	3.75	3.34	0.94	0.48	0.02	0.12
Metropolitan	766	3.89	3.46	0.97	0.49	0.02	0.11
Metro Males	403	3.97	3.43	1.01	0.50	0.03	0.13
Metro Females	363	3.80	3.50	0.93	0.48	0.02	0.08
Non-Metropolitan	358	3.44	3.02	0.86	0.46	0.02	0.13
Non-Metro Males	171	3.95	3.32	0.93	0.50	0.03	0.14
Non-Metro Females	187	2.98	2.65	0.80	0.41	0.02	0.12

TABLE 30

MEANS AND STANDARD DEVIATIONS ON SELECTED ORAL MORBIDITY MEASURES
FOR PERMANENT TEETH BY SEX AND LOCATION FOR 8 - 9 YEAR OLDS ,
ONTARIO SAMPLE, 1977

	N	Oral Hygiene Index		Periodontal Index		Modified Periodontal Index ¹	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	1,124	0.96	0.52	0.31	0.28	0.31	0.28
Metropolitan	766	1.00	0.53	0.32	0.28	0.32	0.28
Metro Males	403	1.04	0.55	0.34	0.29	0.34	0.29
Metro Females	363	0.95	0.50	0.30	0.27	0.30	0.27
Non Metropolitan	358	0.89	0.49	0.29	0.27	0.29	0.27
Non-Metro Males	171	0.96	0.52	0.34	0.30	0.34	0.30
Non-Metro Females	187	0.82	0.45	0.24	0.23	0.24	0.23

¹ With the modified periodontal index a "3" is used as an intermediate value between the "2" and "6". In the original index "3"'s are coded as "6"'s.

TABLE 31

MEANS AND STANDARD DEVIATIONS FOR PERMANENT AND DECIDUOUS TEETH NEEDING ANY TREATMENT,
 RESTORATIONS AND EXTRACTIONS BY SEX AND LOCATION FOR 8 - 9 YEAR OLDS ,

ONTARIO SAMPLE, 1977

Number of Teeth Needing:

	N	Some Treatment		Restoration		Extraction	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	1,124	1.59	2.38	1.39	2.03	0.20	0.72
Metropolitan	766	1.60	2.41	1.39	2.05	0.21	0.76
Metro Males	403	1.60	2.46	1.40	2.07	0.20	0.77
Metro Females	363	1.61	2.36	1.38	2.02	0.23	0.76
Non-Metropolitan	358	1.56	2.32	1.39	1.98	0.16	0.60
Non-Metro Males	171	1.39	2.17	1.23	1.83	0.15	0.62
Non-Metro Females	187	1.71	2.45	1.53	2.11	0.18	0.58

TABLE 32

MEANS AND STANDARD DEVIATIONS FOR TREATMENT TO NEED RATIOS
FOR DECIDUOUS TEETH BY SEX AND LOCATION
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	All Treatment Received Over All Treatment Ever Needed		Successful Treatment Over All Treatment Ever Needed		Failed Treatment Over All Treatment Provided	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	1,124	0.93	0.18	0.90	0.21	0.03	0.14
Metropolitan	766	0.93	0.18	0.91	0.20	0.03	0.14
Metro males	403	0.92	0.19	0.89	0.21	0.03	0.15
Metro females	363	0.94	0.16	0.92	0.20	0.02	0.13
Non-metropolitan	358	0.93	0.18	0.89	0.22	0.02	0.13
Non-metro males	171	0.91	0.19	0.88	0.23	0.02	0.13
Non-metro females	187	0.94	0.17	0.90	0.21	0.03	0.14

TABLE 33

MEANS AND STANDARD DEVIATIONS FOR TREATMENT TO NEED RATIOS
FOR PERMANENT TEETH BY SEX AND LOCATION
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	All Treatment Received Over All Treatment Ever Needed			Successful Treatment Over All Treatment Ever Needed			Failed Treatment Over All Treatment Provided		
		$\bar{X}$	SD		$\bar{X}$	SD		$\bar{X}$	SD	
Total	1,124	0.96	0.14		0.95	0.15		0.06	0.17	
Metropolitan	766	0.96	0.14		0.95	0.14		0.06	0.18	
Metro males	403	0.96	0.14		0.96	0.14		0.06	0.18	
Metro females	363	0.96	0.14		0.95	0.15		0.05	0.18	
Non-metropolitan	358	0.96	0.15		0.95	0.16		0.05	0.15	
Non-metro males	171	0.95	0.15		0.96	0.14		0.05	0.15	
Non-metro females	187	0.96	0.15		0.94	0.17		0.05	0.16	

TABLE 34

LEVELS OF SIGNIFICANCE¹ FOR TWO WAY ANALYSIS OF VARIANCE WITH
SELECTED ORAL MORBIDITY MEASURES ON DECIDUOUS TEETH AS
THE DEPENDENT VARIABLES AND LOCATION AND SEX AS
THE INDEPENDENT VARIABLES FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name Number of Deciduous Teeth	Total Main ² Effects (Additive)	Separate Main ³ Effects (Unique)		Total 2 Way ⁴ Interaction
		Location	Sex	
Present	0.000	0.211	0.000	0.177
Sound	0.004	0.309	0.002	0.093
Affected by caries (dmf)	0.038	0.760	0.012	0.421
Decayed	0.576	0.716	0.333	0.825
Successfully filled	0.021	0.639	0.006	0.340
Filled needing further care	0.839	0.586	0.833	0.461
Lost to caries	0.598	0.394	0.557	0.933

¹ A value of 0.05 or less is significant.

² This value represents the effect of the two independent variables (sex and location) together on the various dependent variables (oral morbidity measures).

³ This value represents the effect of the two independent variables separately on the dependent variable.

⁴ If the interaction is significant it may be concluded that the effect of location varies from one category of sex to another. A significant interaction also implies that the effect of sex is not uniform across different categories of location.

TABLE 35

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
SELECTED ORAL MORBIDITY MEASURES ON PERMANENT TEETH AS
THE DEPENDENT VARIABLES AND LOCATION AND SEX AS
THE INDEPENDENT VARIABLES FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name Number of Permanent Teeth	Total Main Effects (Additive)	Separate Main Effects (Unique)		Total 2 Way Interaction
		Location	Sex	
Present	0.000	0.245	0.000	0.750
Sound	0.000	0.205	0.000	0.468
Affected by caries (DMF)	0.021	0.935	0.006	0.025
Decayed	0.810	0.737	0.569	0.149
Successfully filled	0.031	0.687	0.010	0.282
Filled needing further care	0.572	0.493	0.404	0.367
Lost to caries	0.335	0.536	0.171	0.408
With Gingivitis	0.011	0.044	0.033	0.060

TABLE 36

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
SELECTED ORAL MORBIDITY MEASURES ON PERMANENT TEETH AS
THE DEPENDENT VARIABLES AND LOCATION AND SEX AS
THE INDEPENDENT VARIABLES FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name Number of Permanent Teeth	Total Main Effects (Additive)	Separate Main Effects (Unique)		Total 2 Way Interaction
		Location	Sex	
Debris Index	0.000	0.001	0.001	0.341
Calculus Index	0.361	0.797	0.157	0.962
Oral Hygiene Index - Simplified	0.000	0.002	0.001	0.379
Periodontal Index	0.000	0.117	0.000	0.052
Modified Periodontal Index	0.000	0.113	0.000	0.050

TABLE 37

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
MEASURES OF TREATMENT NEEDED ON DECIDUOUS TEETH AS
THE DEPENDENT VARIABLES AND LOCATION AND SEX AS
THE INDEPENDENT VARIABLES FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name	Total Main Effects	Separate Main Effects (Unique)		Total 2 Way Interaction
	(Additive)	Location	Sex	
Number of teeth needing some treatment	0.699	0.718	0.435	0.304
Number of teeth needing restorations	0.784	0.971	0.485	0.222
Number of teeth needing extraction	0.463	0.271	0.534	0.972

TABLE 38

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
SELECTED ORAL MORBIDITY MEASURES ON DECIDUOUS TEETH AS
THE DEPENDENT VARIABLES AND LOCATION AND SEX AS
THE INDEPENDENT VARIABLES WITH THE NUMBER OF DECIDUOUS TEETH AS
COVARIATE FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name Number of Deciduous teeth	Covariate ¹ Total Number of Deciduous Teeth Present	Total Main Effects (Additive)	Separate Main Effects Location Sex	Total 2 Way Interaction
Sound	0.000	0.123	0.919 0.041	0.313
Affected by caries (dmf)	0.077	0.075	0.798 0.025	0.390
Decayed	0.758	0.600	0.720 0.352	0.829
Successfully filled	0.000	0.152	0.506 0.064	0.241
Filled needing further care	0.377	0.874	0.608 0.951	0.440
Lost to caries	0.000	0.343	0.239 0.411	0.810

¹ "Covariate" is used to designate a metric independent variable which is inserted into a design to remove extraneous variation from the dependent variable, thereby increasing measurement precision.

TABLE 39

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
SELECTED ORAL MORBIDITY MEASURES ON PERMANENT TEETH AS
THE DEPENDENT VARIABLES AND LOCATION AND SEX AS
THE INDEPENDENT VARIABLES WITH THE NUMBER OF PERMANENT TEETH AS
COVARIATE FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name Number of Permanent Teeth	Covariate: Number of Permanent Teeth Present	Total Main Effects (Additive)	Separate Main Effects Location Sex		Total 2 Way Interaction
Sound	0.000	0.727	0.605	0.531	0.039
Affected by caries (DMF)	0.000	0.552	0.655	0.312	0.025
Decayed	0.000	0.733	0.577	0.593	0.160
Successfully filled	0.000	0.259	0.827	0.105	0.300
Filled needing further care	0.000	0.659	0.373	0.865	0.389
Lost to caries	0.005	0.539	0.476	0.378	0.422
With gingivitis	0.000	0.000	0.023	0.001	0.048

TABLE 40

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
SELECTED ORAL MORBIDITY MEASURES ON PERMANENT TEETH AS
THE DEPENDENT VARIABLES AND LOCATION AND SEX AS
THE INDEPENDENT VARIABLES WITH THE NUMBER OF PERMANENT TEETH AS
COVARIATE FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name Number of Permanent Teeth	Covariate: Number of Permanent Teeth Present	Total Main Effects (Additive)	Separate Main Effects		Total 2 Way Interaction
			Location	Sex	
Debris index	0.005	0.000	0.001	0.005	0.351
Calculus index	0.115	0.225	0.847	0.085	0.976
Oral Hygiene index - Simplified	0.023	0.000	0.002	0.003	0.387
Periodontal index	0.133	0.001	0.124	0.001	0.053
Modified Periodontal index	0.131	0.001	0.120	0.001	0.051

TABLE 41

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
MEASURES OF TREATMENT NEEDED AS
THE DEPENDENT VARIABLES AND LOCATION AND SEX AS
THE INDEPENDENT VARIABLES WITH THE NUMBER OF PERMANENT TEETH AS
COVARIATE FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name	Covariate: Number of Permanent Teeth Present	Total Main Effects (Additive)	Separate Main Effects Location Sex		Total 2 Way Interaction
Number of teeth needing some treatment	0.158	0.804	0.684	0.592	0.310
Number of teeth needing restorations	0.225	0.885	0.941	0.624	0.226
Number of teeth needing extraction	0.207	0.490	0.253	0.693	0.963

Study Areas

In designing the survey, four areas in the province were chosen, two being in the "Golden Horseshoe", one in eastern Ontario and one in north-western Ontario. All four areas have a metropolitan region and a non-metropolitan region. The non-metropolitan region is sizeable in both Cornwall and Oshawa but less than 10 percent in Toronto and about 20 percent in Thunder Bay.

In terms of number of deciduous teeth present, Table 42 indicates that with 10.74 Toronto has the highest number among the metropolitan regions and Thunder Bay with 9.09 has the lowest. The same pattern follows for the non-metropolitan regions of the study areas. For number of sound teeth present (Table 43) again Toronto and Thunder Bay are at opposite ends of the continuum for both locations. The males in all areas have more teeth and more sound teeth present than do the females with the exception of non-metro Toronto. The mean age of 8 and 9 year old children in each of the four study areas is somewhat different.

Table 44 presents the caries experience for deciduous teeth for the four study areas by age and location. For the metropolitan regions of the four centres it appears that Toronto and Oshawa have a lower average dmf than do Thunder Bay and Cornwall. In the metropolitan region of all areas except Cornwall, the males have a higher dmf than do the females. In the non-metropolitan areas, Cornwall has the highest dmf with at least one tooth higher than any other area. As for sex differences in the non-metropolitan areas, males have a higher dmf than females in Oshawa and Cornwall while the opposite is true in Toronto and Thunder Bay.

Table 45 indicates that the number of decayed deciduous teeth is highest in Cornwall (1.88 and 1.79) and Thunder Bay (1.41 and 1.20). Likewise, Table 46 shows that the deciduous teeth lost due to caries is higher in these locations (0.50, 0.51, 0.60, 0.30). On the other hand as seen in Table 47 there is no discernible pattern among the study areas for number of teeth successfully filled.

In terms of permanent teeth present (Table 49) for metropolitan areas, Oshawa has the highest number (14.00) and Cornwall the lowest (12.01). For non-metropolitan areas, Cornwall again is the lowest in terms of teeth present (12.21) but Thunder Bay is the highest (14.39). The same pattern follows for number of sound teeth (Table 50). For most locations females have more teeth present and more sound teeth present.

Table 51 shows that the DMF's for permanent teeth in Thunder Bay (2.35 and 1.88) are higher than in the other three centres. As for decayed teeth, again, Thunder Bay is higher but only for the metropolitan region.

For all areas except Toronto the metropolitan regions have higher gingivitis scores than do the non-metropolitan as can be seen in Table 56. However, the differences in the periodontal index between metropolitan and non-metropolitan in Table 57 and the oral hygiene index in Table 58 are minimal.

Tables 59 to 64 present selected treatment/need ratios for permanent and deciduous teeth for the four study areas. Table 59 indicates that Metropolitan Cornwall has the highest treatment/need ratio for deciduous teeth (0.95). However, the differences among the four centres are

minimal. For non-metropolitan regions, Oshawa has the highest ratio (0.94). In terms of sex differences, females in all locations have higher ratios than males except in Non-Metropolitan Thunder Bay. The pattern for successful treatment of deciduous teeth is similar as shown in Table 60. For failed treatment, Thunder Bay has the highest ratio for both metropolitan and non-metropolitan areas (0.07). In terms of sex differences there is no consistent pattern among the four study areas (Table 61).

For permanent teeth Metropolitan Cornwall (0.98) and Non-Metropolitan Thunder Bay (0.98) have the highest ratios for all treatment required (Table 62). Again, there are no consistent patterns among sex differences. As indicated in Table 63 Metropolitan Cornwall has the highest ratio for successful treatment (0.97), but the non-metropolitan areas are almost identical. Sex differences show no pattern as in previous tables.

Metropolitan Oshawa in Table 64 has the highest failed treatment ratio (0.04) and Non-Metropolitan Cornwall the lowest (0.01). The differences by sex and location, however, on all of these measures is minimal.

Fluoride Status

Fluoride has been added to the water supplies of various Ontario communities as a public health measure to reduce the incidence of caries. The following tables (65 through 81) compare those children born in a fluoridated area with those children born in a non-fluoridated area on selected oral morbidity measures controlling for sex and location.

Table 67 indicates that for every category of sex and location the fluoride group has a lower dmf (deciduous teeth) than does the non-fluoride group. As shown in Table 68 the incidence of decayed deciduous teeth is lower for the fluoride group (0.70 vs. 1.20). Likewise, the fluoride group has lost fewer deciduous teeth to caries according to Table 69 (0.16 vs. 0.38).

The number of deciduous teeth successfully filled (1.55 vs. 1.70) and the number of filled deciduous teeth requiring further care (0.15 vs. 0.22) are also lower for the fluoride group as shown in Tables 70 and 71 although the differences are not as great as in some of the previous measures.

Tables 74 to 78 present the caries measures for permanent teeth and again on every indicator the fluoride group has a lower score; that is, a better oral health status than the non-fluoride group.

In terms of oral hygiene measures (Tables 79 to 81) the results indicate that for the total sample and both sexes in the metropolitan group the fluoride sample has lower scores than the non-fluoride sample. However, the non-metropolitan fluoride group has higher scores on gingivitis and the periodontal index than does the non-fluoride group. It is the higher scores of non-metropolitan fluoride males that seems to be accounting for this shift in pattern.

In order to evaluate whether the observed differences between the fluoride and non-fluoride groups were significant, a student's t test was used.

Tables 82 and 83 list the oral morbidity measures for which there was a significant difference between those children born in a fluoride

area and those children not born in a fluoride area. Those children for whom no data were available were excluded from the analysis. For deciduous teeth, as would be expected, the fluoride group shows significantly lower scores on many of the oral morbidity measures. This finding is all the more interesting when one notes that the fluoride group has significantly more deciduous teeth present than does the non-fluoride group, and therefore there are more teeth at risk of decay. A further comparison of these two groups was made on the number of sound teeth present as a proportion of all deciduous teeth present in order to control for the different number of teeth. For the fluoride group, sound teeth were more than three quarters of all teeth present (76.6%) whereas for the non-fluoride group it was less than two thirds (65.9%). Likewise, the proportion of decayed teeth present is higher for the non-fluoride group than for the fluoride, the figures being 13.1 percent and 6.8 percent respectively.

The findings for permanent teeth are similar in that for many oral morbidity measures the fluoride group has significantly lower average scores. Despite the fact that the fluoride group has significantly fewer permanent teeth present, there is no difference between the two groups in the number of sound teeth present. An average of ninety percent of the fluoride group's teeth are sound. The difference in the proportion of decayed teeth is not as marked as for the deciduous teeth, with the fluoride group having 4.1 percent decayed and the non-fluoride group, 5.8 percent decayed. This seems to indicate that as time goes on and the length of time the teeth have been at risk increases, the differences between fluoride and non-fluoride groups become more marked.

A further comparison of the fluoride and non-fluoride groups in terms of treatment/need ratios was made in Tables 84 to 87. The differences between the groups are minimal, although consistently in the direction of the fluoride group having a slightly higher ratio. What this means is that the differences in the oral morbidity measures between the fluoride and non-fluoride groups cannot be attributed to a difference in the treatment levels (quality or quantity) of the two groups. Other factors are causing the differences to occur.

Summary

To summarize the findings from the oral examination, some of the significant findings are listed:

- 1) Eight and nine year olds have mixed dentition. The average dmf for the Ontario sample was 3.07, while the DMF was 1.55.
- 2) Because number of teeth present differs between males and females, it is more appropriate to view the findings as percent of teeth present. For deciduous teeth, decayed teeth comprise 10.0 percent of teeth present for the females and 9.8 percent of teeth present for the males. For permanent teeth, decayed teeth are 4.9 percent of teeth present for females and 5.0 percent for males.
- 3) The metropolitan group has significantly higher scores on gingivitis, debris and oral hygiene than the non-metropolitan group.
- 4) Males have more deciduous teeth than females and higher dmf. The latter seems to be accounted for by significantly more successfully filled teeth.

- 5) Females have more permanent teeth than males but there is no significant difference in DMF.
- 6) Males have significantly higher debris, oral hygiene and periodontal scores than females.
- 7) The fluoride group has lower scores than the non-fluoride on dmf, DMF, decayed permanent and deciduous teeth and number of deciduous and permanent teeth lost to caries.
- 8) There were no differences in treatment needs by sex or location.

TABLE 42

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
DECIDUOUS TEETH BY SEX AND LOCATION
FOR 8-9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 9.84$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	10.74	2.94	182	9.16	3.55	76	10.32	3.39	176	9.09	3.78
Metro males	170	11.28	2.75	96	9.38	3.65	37	10.78	2.87	100	9.83	3.29
Metro females	162	10.18	3.04	86	8.93	3.45	39	9.87	3.81	76	8.12	4.17
Non-Metropolitan	29	10.83	2.73	188	9.27	3.37	92	10.59	2.74	49	8.43	3.70
Non-metro males	15	10.33	3.50	84	10.14	3.06	50	11.40	2.37	22	9.50	3.42
Non-metro females	14	11.36	1.50	104	8.57	3.46	42	9.62	2.86	27	7.56	3.76

TABLE 43
MEANS AND STANDARD DEVIATIONS FOR NUMBER OF SOUND DECIDUOUS TEETH
BY SEX AND LOCATION
FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977
(Total sample $\bar{X} = 7.01$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	8.08	3.79	182	6.76	3.95	76	6.95	3.85	176	5.70	4.15
Metro males	170	8.42	3.74	96	6.80	4.03	37	7.14	3.83	100	6.06	4.19
Metro females	162	7.72	3.81	86	6.72	3.89	39	6.77	3.91	76	5.22	4.08
Non-metropolitan	29	8.55	3.72	188	6.61	3.77	92	7.23	3.55	49	5.82	3.66
Non-metro males	15	8.13	4.16	84	7.25	3.71	50	7.88	3.39	22	7.18	3.40
Non-metro females	14	9.00	3.28	104	6.09	3.75	42	6.45	3.62	27	4.70	3.54

TABLE 44

MEANS AND STANDARD DEVIATIONS FOR CARIES EXPERIENCE (dmf) FOR
 DECIDUOUS TEETH BY SEX AND LOCATION
 FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total sample $\bar{X} = 3.07$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	2.69	2.61	182	2.70	2.61	76	3.84	3.30	176	3.96	3.24
Metro males	170	2.89	2.56	96	2.92	2.62	37	3.78	3.23	100	4.36	3.41
Metro females	162	2.48	2.64	86	2.45	2.60	39	3.90	3.41	76	3.45	2.95
Non-Metropolitan	29	2.31	2.42	188	2.76	2.46	92	3.86	2.97	49	2.90	2.59
Non-metro males	15	2.27	2.19	84	2.94	2.70	50	3.90	2.79	22	2.77	2.47
Non-metro females	14	2.36	2.73	104	2.60	2.25	42	3.81	3.20	27	3.00	2.73

TABLE 45

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF DECAYED DECIDUOUS TEETH BY
SEX AND LOCATION FOR 8 - 9 YEAR OLDS
FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total sample $\bar{X} = 0.97$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	0.64	1.33	182	0.83	1.39	76	1.88	2.41	176	1.41	2.27
Metro males	170	0.70	1.40	96	0.91	1.42	37	1.40	1.83	100	1.56	2.53
Metro females	162	0.58	1.25	86	0.74	1.36	39	2.33	2.81	76	1.22	1.88
Non-Metropolitan	29	0.28	0.84	188	0.56	1.13	92	1.79	2.36	49	1.20	1.64
Non-metro males	15	0.40	1.12	84	0.67	1.27	50	1.58	2.08	22	1.45	1.99
Non-metro females	14	0.14	0.36	104	0.47	1.00	42	2.05	2.65	27	1.00	1.30

TABLE 46

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF DECIDUOUS TEETH
LOST TO CARIES BY SEX AND LOCATION FOR
8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total sample $\bar{X} = 0.26$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	0.04	0.27	182	0.28	0.99	76	0.50	1.69	176	0.60	1.45
Metro males	170	0.05	0.29	96	0.30	1.09	37	0.16	0.44	100	0.60	1.39
Metro females	162	0.02	0.25	86	0.27	0.87	39	0.82	2.29	76	0.60	1.52
Non-Metropolitan	29	0.00	0.00	188	0.09	0.53	92	0.51	1.25	49	0.30	1.08
Non-metro males	15	0.00	0.00	84	0.05	0.34	50	0.40	1.05	22	0.45	1.37
Non-metro females	14	0.00	0.00	104	0.13	0.65	42	0.64	1.46	27	0.19	0.79

TABLE 47

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF SUCCESSFULLY FILLED DECIDUOUS TEETH BY
SEX AND LOCATION FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977
(Total sample $\bar{X} = 1.64$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	1.80	2.16	182	1.43	1.95	76	1.28	2.24	176	1.66	2.33
Metro males	170	1.93	2.10	96	1.54	2.01	37	1.92	2.59	100	1.92	2.53
Metro females	162	1.67	2.21	86	1.30	1.89	39	0.67	1.66	76	1.33	2.02
Non-Metropolitan	29	1.83	1.98	188	1.91	2.10	92	1.42	2.03	49	1.16	1.75
Non-metro males	15	1.73	1.98	84	2.01	2.20	50	1.80	2.26	22	0.77	1.31
Non-metro females	14	1.93	2.06	104	1.83	2.02	42	0.98	1.63	27	1.48	2.01

TABLE 48

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
DECIDUOUS TEETH FILLED AND NEEDING FURTHER CARE BY
SEX AND LOCATION FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total sample $\bar{X} = 0.20$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	0.21	0.60	182	0.15	0.44	76	0.18	0.53	176	0.28	1.00
Metro males	170	0.20	0.59	96	0.17	0.43	37	0.30	0.66	100	0.28	0.94
Metro females	162	0.21	0.61	86	0.14	0.46	39	0.08	0.35	76	0.29	1.07
Non-Metropolitan	29	0.21	0.56	188	0.20	0.64	92	0.14	0.41	49	0.22	0.59
Non-metro males	15	0.13	0.35	84	0.21	0.60	50	0.14	0.40	22	0.09	0.29
Non-metro females	14	0.28	0.73	104	0.18	0.68	42	0.14	0.42	27	0.33	0.73

TABLE 49

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF PERMANENT TEETH

BY SEX AND LOCATION

FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 13.10$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	12.44	2.98	182	14.00	3.65	76	12.01	3.07	176	13.49	3.31
Metro males	170	11.78	2.80	96	13.75	3.56	37	11.51	2.80	100	12.79	2.80
Metro females	162	13.14	3.01	86	14.28	3.76	39	12.49	3.28	76	14.42	3.70
Non-metropolitan	29	12.72	2.64	188	13.66	3.44	92	12.21	2.69	49	14.39	3.53
Non-metro males	15	13.27	3.37	84	12.99	3.20	50	11.52	2.14	22	13.50	3.49
Non-metro females	14	12.14	1.46	104	14.20	3.55	42	13.02	3.06	27	15.11	3.47

TABLE 50

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF SOUND PERMANENT TEETH

BY SEX AND LOCATION

FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 11.56$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	11.13	3.05	182	12.56	3.46	76	10.86	3.24	176	11.24	2.88
Metro males	170	10.64	2.78	96	12.23	3.24	37	10.32	1.82	100	10.61	2.48
Metro females	162	11.65	3.24	86	12.93	3.67	39	11.36	3.56	76	12.08	3.14
Non-metropolitan	29	11.31	2.19	188	12.16	3.44	92	10.68	2.61	49	12.57	3.33
Non-metro males	15	11.80	2.57	84	11.70	3.30	50	10.16	2.33	22	12.68	3.26
Non-metro females	14	10.78	1.62	104	12.54	3.51	42	11.31	2.82	27	12.48	3.45

TABLE 51

MEANS AND STANDARD DEVIATIONS FOR CARIES EXPERIENCE (DMF)
FOR PERMANENT TEETH BY SEX AND LOCATION FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977
(Total sample $\bar{X} = 1.55$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	1.30	1.43	182	1.37	1.54	76	1.17	1.43	176	2.35	1.88
Metro males	170	1.15	1.42	96	1.41	1.61	37	1.19	1.47	100	2.26	1.78
Metro females	162	1.46	1.43	86	1.34	1.47	39	1.15	1.41	76	2.46	2.01
Non-Metropolitan	29	1.34	1.37	188	1.51	1.54	92	1.52	1.62	49	1.88	1.90
Non-metro males	15	1.33	1.35	84	1.26	1.36	50	1.38	1.47	22	0.82	1.56
Non-metro females	14	1.36	1.45	104	1.71	1.65	42	1.69	1.79	27	2.74	1.72

TABLE 52

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF DECAYED PERMANENT TEETH BY
SEX AND LOCATION FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total sample $\bar{X} = 0.64$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	0.45	0.90	182	0.67	1.11	76	0.63	1.04	176	1.01	1.49
Metro males	170	0.42	0.89	96	0.74	1.20	37	0.49	0.90	100	1.08	1.51
Metro females	162	0.49	0.91	86	0.59	1.00	39	0.77	1.16	76	0.92	1.46
Non-Metropolitan	29	0.10	0.31	188	0.53	0.98	92	0.92	1.41	49	0.78	1.53
Non-metro males	15	0.13	0.35	84	0.51	0.94	50	0.72	1.01	22	0.45	1.35
Non-metro females	14	0.07	0.27	104	0.54	1.01	42	1.17	1.75	27	1.04	1.65

TABLE 53

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
PERMANENT TEETH LOST TO CARIES BY SEX AND LOCATION
FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977
(Total sample $\bar{X} = 0.04$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	0.01	0.13	182	0.04	0.24	76	0.04	0.34	176	0.10	0.50
Metro males	170	0.01	0.11	96	0.04	0.25	37	0.00	0.00	100	0.08	0.46
Metro females	162	0.01	0.16	86	0.03	0.24	39	0.08	0.48	76	0.13	0.55
Non-Metropolitan	29	0.00	0.00	188	0.03	0.37	92	0.02	0.15	49	0.06	0.43
Non-metro males	15	0.00	0.00	84	0.00	0.00	50	0.02	0.14	22	0.00	0.00
Non-metro females	14	0.00	0.00	104	0.06	0.50	42	0.02	0.15	27	0.11	0.58

TABLE 54

MEANS AND STANDARD DEVIATIONS OF NUMBER OF
SUCCESSFULLY FILLED PERMANENT TEETH BY SEX AND LOCATION
FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total sample $\bar{X} = 0.83$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	0.80	1.24	182	0.62	1.16	76	0.50	1.09	176	1.19	1.55
Metro males	170	0.69	1.22	96	0.58	1.11	37	0.65	1.21	100	1.04	1.41
Metro females	162	0.91	1.26	86	0.65	1.12	39	0.36	0.96	76	1.38	1.70
Non-Metropolitan	29	1.17	1.31	188	0.92	1.29	92	0.58	1.01	49	0.96	1.53
Non-metro males	15	1.07	1.28	84	0.76	1.89	50	0.60	1.14	22	0.36	1.00
Non-metro females	14	1.29	1.38	104	1.05	1.35	42	0.55	1.06	27	1.44	1.72

TABLE 55

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
PERMANENT TEETH FILLED AND NEEDING FURTHER CARE BY

SEX AND LOCATION FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total sample $\bar{X} = 0.06$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	0.05	0.29	182	0.09	0.33	76	0.03	0.16	176	0.05	0.25
Metro males	170	0.04	0.25	96	0.08	0.31	37	0.05	0.23	100	0.06	0.28
Metro females	162	0.06	0.33	86	0.10	0.34	39	0.00	0.00	76	0.04	0.20
Non-Metropolitan	29	0.07	0.26	188	0.05	0.26	92	0.02	0.21	49	0.08	0.28
Non-metro males	15	0.13	0.35	84	0.01	0.11	50	0.04	0.28	22	0.00	0.00
Non-metro females	14	0.00	0.00	104	0.08	0.33	42	0.00	0.00	27	0.15	0.36

TABLE 56

MEANS AND STANDARD DEVIATIONS OF NUMBER OF TEETH WITH GINGIVITIS BY
SEX AND LOCATION FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total sample $\bar{X} = 3.75$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	3.77	3.47	182	4.00	3.31	76	3.50	3.13	176	4.16	3.74
Metro males	170	3.95	3.64	96	4.00	3.02	37	3.65	3.05	100	4.10	3.60
Metro females	162	3.59	3.28	86	4.00	3.62	39	3.36	3.25	76	4.25	3.94
Non-Metropolitan	29	4.24	3.67	188	3.35	2.90	92	3.33	2.93	49	3.55	3.26
Non-metro males	15	5.53	4.27	84	3.81	3.09	50	3.84	3.16	22	3.64	3.75
Non-metro females	14	2.86	2.32	104	2.97	2.70	42	2.71	2.53	27	3.48	2.87

TABLE 57

MEANS AND STANDARD DEVIATIONS FOR PERIODONTAL INDEX BY
SEX AND LOCATION FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977
(Total sample $\bar{X} = 0.31$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	0.32	0.29	182	0.31	0.26	76	0.32	0.29	176	0.33	0.29
Metro males	170	0.35	0.32	96	0.32	0.26	37	0.34	0.29	100	0.33	0.28
Metro females	162	0.29	0.26	86	0.30	0.25	39	0.29	0.29	76	0.32	0.30
Non-Metropolitan	29	0.35	0.28	188	0.27	0.25	92	0.29	0.26	49	0.31	0.36
Non-metro males	15	0.45	0.32	84	0.33	0.28	50	0.35	0.28	22	0.33	0.40
Non-metro females	14	0.24	0.19	104	0.23	0.21	42	0.22	0.22	27	0.29	0.34

TABLE 58

MEANS AND STANDARD DEVIATIONS FOR ORAL HYGIENE INDEX BY
SEX AND LOCATION FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total sample $\bar{X} = 0.48$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	1.03	0.53	182	0.89	0.38	76	1.29	0.78	176	0.91	0.45
Metro males	170	1.04	0.56	96	0.94	0.38	37	1.49	0.85	100	0.95	0.45
Metro females	162	1.03	0.51	86	0.82	0.37	39	1.10	0.67	76	0.87	0.46
Non-Metropolitan	29	1.26	0.55	188	0.77	0.43	92	0.96	0.53	49	0.98	0.48
Non-metro males	15	1.29	0.51	84	0.84	0.45	50	1.08	0.61	22	0.97	0.47
Non-metro females	14	1.24	0.60	104	0.72	0.40	42	0.82	0.37	27	0.98	0.49

TABLE 59

MEANS AND STANDARD DEVIATIONS FOR RATIO
OF ALL TREATMENT RECEIVED OVER ALL TREATMENT EVER NEEDED

FOR DECIDUOUS TEETH

BY SEX, LOCATION AND STUDY AREA

FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 0.93$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	0.93	0.18	182	0.93	0.18	76	0.95	0.15	176	0.93	0.19
Metro males	170	0.92	0.19	96	0.92	0.17	37	0.91	0.20	100	0.92	0.21
Metro females	162	0.93	0.17	86	0.93	0.18	39	0.98	0.07	76	0.96	0.15
Non-metropolitan	29	0.93	0.19	188	0.94	0.16	92	0.90	0.21	49	0.92	0.18
Non-metro males	15	0.91	0.24	84	0.91	0.19	50	0.90	0.20	22	0.97	0.14
Non-metro females	14	0.96	0.13	104	0.97	0.12	42	0.91	0.23	27	0.87	0.20

TABLE 60

MEANS AND STANDARD DEVIATIONS FOR RATIO
OF SUCCESSFUL TREATMENT OVER ALL TREATMENT EVER NEEDED FOR
FOR DECIDUOUS TEETH
BY SEX, LOCATION AND STUDY AREA FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X} = 0.90$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	0.90	0.21	182	0.90	0.21	76	0.92	0.17	176	0.91	0.21
Metro-males	170	0.90	0.21	96	0.88	0.20	37	0.88	0.21	100	0.90	0.22
Metro females	162	0.91	0.20	86	0.91	0.21	39	0.97	0.11	76	0.94	0.19
Non-metropolitan	29	0.89	0.21	188	0.90	0.21	92	0.89	0.21	49	0.86	0.24
Non-metro males	15	0.87	0.28	84	0.87	0.24	50	0.88	0.21	22	0.95	0.18
Non-metro females	14	0.92	0.17	104	0.92	0.19	42	0.90	0.21	27	0.79	0.25

TABLE 61

RATIO OF NEED FOR RETREATMENT TO TOTAL TREATMENT PROVIDED FOR
DECIDUOUS TEETH BY SEX AND LOCATION
FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977
(Total sample $\bar{X} = 0.06$)

	Toronto		Oshawa		Cornwall		Thunder Bay	
	N	Ratio	N	Ratio	N	Ratio	N	Ratio
Metropolitan	332	0.06	182	0.04	76	0.05	176	0.07
Metro males	170	0.06	96	0.04	37	0.09	100	0.07
Metro females	162	0.06	86	0.04	39	0.02	76	0.06
Non-Metropolitan	29	0.05	188	0.05	92	0.05	49	0.07
Non-metro males	15	0.06	84	0.05	50	0.04	22	0.03
Non-metro females	14	0.04	104	0.04	42	0.05	27	0.09

TABLE 62

MEANS AND STANDARD DEVIATIONS FOR RATIO OF
ALL TREATMENT RECEIVED OVER ALL TREATMENT EVER NEEDED FOR PERMANENT TEETH
BY SEX, LOCATION AND STUDY AREA FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X} = 0.96$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	0.96	0.13	182	0.96	0.13	76	0.98	0.12	176	0.94	0.17
Metro males	170	0.98	0.10	96	0.96	0.13	37	0.95	0.14	100	0.93	0.15
Metro females	162	0.95	0.15	86	0.96	0.13	39	0.98	0.09	76	0.95	0.15
Non-metropolitan	29	0.97	0.11	188	0.95	0.16	92	0.95	0.17	49	0.98	0.06
Non-metro males	15	0.97	0.13	84	0.94	0.18	50	0.95	0.15	22	1.00	0.00
Non-metro females	14	0.98	0.09	104	0.96	0.14	42	0.94	0.19	27	0.97	0.08

TABLE 63

MEANS AND STANDARD DEVIATIONS FOR RATIO OF
SUCCESSFUL TREATMENT OVER ALL TREATMENT EVER NEEDED FOR PERMANENT TEETH
BY SEX, LOCATION AND STUDY AREA FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 0.95$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	332	0.96	0.13	182	0.95	0.15	76	0.97	0.12	176	0.93	0.17
Metro males	170	0.97	0.11	96	0.96	0.13	37	0.95	0.14	100	0.93	0.18
Metro females	162	0.95	0.15	86	0.94	0.16	39	0.98	0.09	76	0.94	0.16
Non-metropolitan	29	0.96	0.12	188	0.95	0.17	92	0.95	0.16	49	0.96	0.12
Non-metro males	15	0.95	0.14	84	0.95	0.16	50	0.96	0.13	22	1.00	0.00
Non-metro females	14	0.98	0.09	104	0.95	0.17	42	0.94	0.19	27	0.93	0.15

TABLE 64

RATIO OF NEED FOR RETREATMENT TO TOTAL TREATMENT PROVIDED FOR
PERMANENT TEETH BY SEX AND LOCATION
FOR 8 - 9 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977
(Total sample $\bar{X} = 0.03$)

	Toronto		Oshawa		Cornwall		Thunder Bay	
	N	Ratio	N	Ratio	N	Ratio	N	Ratio
Metropolitan	332	0.02	182	0.04	76	0.02	176	0.02
Metro males	170	0.02	96	0.04	37	0.04	100	0.03
Metro females	162	0.03	86	0.04	39	0.00	76	0.01
Non-Metropolitan	29	0.04	188	0.02	92	0.01	49	0.04
Non-metro males	15	0.08	84	0.01	50	0.02	22	0.00
Non-metro females	14	0.00	104	0.03	42	0.00	27	0.08

TABLE 65

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
DECIDUOUS TEETH BY SEX, LOCATION AND FLUORIDE STATUS¹
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X}$ = 9.84)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	10.33	3.03	424	9.19	3.69	184	9.97	3.39
Metropolitan	378	10.46	3.01	253	9.27	3.78	135	9.78	3.60
Metro Males	194	10.82	2.97	131	10.10	3.30	78	9.96	3.60
Metro Females	184	10.07	3.02	122	8.38	4.06	57	9.54	3.62
Non-Metropolitan	138	10.00	3.07	171	9.07	3.55	49	10.47	2.71
Non-Metro Males	65	10.98	2.58	78	9.92	3.32	28	10.64	2.88
Non-Metro Females	73	9.12	3.22	93	8.35	3.60	21	10.24	2.51

¹ "Fluoride Status" refers to whether the respondent was born in a fluoride area, was not born in a fluoride area or there was no information.

TABLE 66

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF SOUND
DECIDUOUS TEETH BY SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X} = 7.01$)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	X	SD
Total	516	7.91	3.68	424	6.06	4.02	184	6.70	3.88
Metropolitan	378	8.06	3.73	253	6.05	4.12	135	6.42	4.03
Metro Males	194	8.26	3.78	131	6.61	4.07	78	6.23	4.15
Metro Females	184	7.85	3.68	122	5.45	4.10	57	6.68	3.87
Non-Metropolitan	138	7.51	3.51	171	6.07	3.89	49	7.45	3.38
Non-Metro Males	65	8.32	3.15	78	6.70	3.90	28	7.82	3.39
Non-Metro Females	73	6.79	3.68	93	5.54	3.82	21	6.95	3.40

TABLE 67

MEANS AND STANDARD DEVIATIONS FOR CARIES EXPERIENCE (dmf) FOR
DECIDUOUS TEETH BY SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X} = 3.07$)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	2.56	2.59	424	3.49	2.88	184	3.54	3.04
Metropolitan	378	2.58	2.69	253	3.60	2.96	135	3.61	3.06
Metro Males	194	2.70	2.59	131	3.86	3.04	78	4.08	3.21
Metro Females	184	2.46	2.79	122	3.31	2.87	57	2.98	2.74
Non-Metropolitan	138	2.52	2.30	171	3.34	2.76	49	3.33	3.01
Non-Metro Males	65	2.72	2.38	78	3.47	2.81	28	3.18	2.98
Non-Metro Females	73	2.34	2.22	93	3.22	2.74	21	3.52	3.11

TABLE 68

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF DECAYED
DECIDUOUS TEETH BY SEX, LOCATION AND FLUORIDE STATUS FOR
8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X}$ = 0.97)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	0.70	1.45	424	1.20	1.95	184	1.21	1.88
Metropolitan	378	0.70	1.45	253	1.29	2.06	135	1.21	1.91
Metro Males	194	0.68	1.34	131	1.33	2.22	78	1.37	1.97
Metro Females	184	0.72	1.57	122	1.25	1.88	57	0.98	1.82
Non-Metropolitan	138	0.70	1.45	171	1.06	1.79	49	1.20	1.82
Non-Metro Males	65	0.85	1.44	78	1.08	1.86	28	1.21	1.73
Non-Metro Females	73	0.58	1.46	93	1.04	1.73	21	1.19	1.99

TABLE 69

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
DECIDUOUS TEETH LOST TO CARIES BY
SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X} = 0.26$)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	0.16	0.80	424	0.38	1.18	184	0.25	0.94
Metropolitan	378	0.20	0.91	253	0.40	1.22	135	0.23	0.97
Metro Males	194	0.16	0.62	131	0.38	1.21	78	0.29	0.99
Metro Females	184	0.24	1.14	122	0.43	1.24	57	0.14	0.93
Non-Metropolitan	138	0.04	0.28	171	0.34	1.12	49	0.31	0.85
Non-Metro Males	65	0.06	0.39	78	0.26	0.96	28	0.36	0.99
Non-Metro Females	73	0.01	0.12	93	0.42	1.24	21	0.24	0.62

TABLE 70

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
DECIDUOUS TEETH SUCCESSFULLY FILLED BY
SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X} = 1.64$)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	1.55	2.04	424	1.70	2.16	184	1.78	2.26
Metropolitan	378	1.53	2.11	253	1.66	2.14	135	1.84	2.34
Metro Males	194	1.73	2.18	131	1.88	2.23	78	2.02	2.41
Metro Females	184	1.33	2.03	122	1.43	2.02	57	1.60	2.23
Non-Metropolitan	138	1.61	1.85	171	1.75	2.18	49	1.59	2.05
Non-Metro Males	65	1.65	1.89	78	1.97	2.33	28	1.46	2.08
Non-Metro Females	73	1.58	1.83	93	1.57	2.04	21	1.76	2.05

TABLE 71

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
DECIDUOUS TEETH FILLED AND NEEDING FURTHER CARE BY
SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X} = 0.20$)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	0.15	0.51	424	0.22	0.67	184	0.30	0.88
Metropolitan	378	0.14	0.47	253	0.24	0.76	135	0.33	0.95
Metro Males	194	0.12	0.37	131	0.27	0.71	78	0.38	1.05
Metro Females	184	0.16	0.55	122	0.21	0.82	57	0.26	0.79
Non Metropolitan	138	0.17	0.63	171	0.19	0.51	49	0.22	0.65
Non-Metro Males	65	0.17	0.52	78	0.18	0.48	28	0.14	0.52
Non-Metro Females	73	0.18	0.71	93	0.19	0.54	21	0.33	0.80

TABLE 72

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
PERMANENT TEETH BY SEX, LOCATION AND FLUORIDE STATUS

FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X}$ = 13.10)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	12.78	2.97	424	13.55	3.66	184	12.97	3.26
Metropolitan	378	12.68	2.94	253	13.43	3.73	135	13.14	3.38
Metro Males	194	12.28	2.91	131	12.50	3.23	78	12.92	3.34
Metro Females	184	13.10	2.92	122	14.44	3.97	57	13.44	3.45
Non-Metropolitan	138	13.07	3.03	171	13.73	3.56	49	12.51	2.86
Non-Metrop Males	65	12.25	2.32	78	13.04	3.46	28	12.50	3.30
Non-Metro Females	73	13.81	3.40	93	14.31	3.55	21	12.52	2.23

TABLE 73

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
SOUND PERMANENT TEETH BY SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X} = 11.56$)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	11.51	3.04	424	11.71	3.39	184	11.38	3.15
Metropolitan	378	11.42	3.09	253	11.57	3.33	135	11.43	3.18
Metro Males	194	11.13	2.95	131	10.78	2.92	78	10.95	2.80
Metro Females	184	11.72	3.21	122	12.42	3.55	57	12.09	3.57
Non-Metropolitan	138	11.78	2.88	171	11.91	3.48	49	11.24	3.11
Non-Metro Males	65	11.05	2.29	78	11.63	3.44	28	11.50	3.62
Non-Metro Females	73	12.44	3.20	93	12.15	3.51	21	10.90	2.30

TABLE 74

MEANS AND STANDARD DEVIATIONS FOR TOTAL CARIES EXPERIENCE FOR
PERMANENT TEETH BY SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X}$ = 1.55)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	1.25	1.42	424	1.90	1.77	184	1.58	1.63
Metropolitan	378	1.24	1.42	253	1.92	1.81	135	1.69	1.67
Metro Males	194	1.14	1.41	131	1.78	1.78	78	1.86	1.70
Metro Females	184	1.35	1.43	122	2.07	1.83	57	1.46	1.62
Non-Metropolitan	138	1.27	1.41	171	1.86	1.73	49	1.26	1.47
Non-Metro Males	65	1.15	1.23	78	2.24	1.75	28	1.62	1.69
Non-Metro Females	73	1.37	1.56	93	2.24	1.75	21	1.62	1.69

TABLE 75

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
DECAYED PERMANENT TEETH BY SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample X = 0.64)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	0.53	1.00	424	0.79	1.32	184	0.64	1.11
Metropolitan	378	0.53	0.98	253	0.80	1.31	135	0.70	1.19
Metro Males	194	0.52	0.96	131	0.78	1.33	78	0.85	1.35
Metro Females	184	0.55	1.01	122	0.83	1.29	57	0.51	0.91
Non-Metropolitan	138	0.51	1.04	171	0.77	1.34	49	0.47	0.84
Non-Metro Males	65	0.51	0.81	78	0.54	1.16	28	0.57	0.88
Non-Metro Females	73	0.52	1.21	93	0.96	1.45	21	0.33	0.80

TABLE 76

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
PERMANENT TEETH LOST TO CARIES BY SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X} = 0.41$)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	0.01	0.09	424	0.07	0.44	184	0.05	0.34
Metropolitan	378	0.00	0.07	253	0.08	0.43	135	0.07	0.40
Metro Males	194	0.00	0.07	131	0.08	0.42	78	0.04	0.25
Metro Females	184	0.00	0.07	122	0.08	0.44	57	0.12	0.54
Non-Metropolitan	138	0.01	0.12	171	0.05	0.45	49	0.00	0.00
Non-Metro Males	65	0.00	0.00	78	0.01	0.11	28	0.00	0.00
Non-Metro Females	73	0.03	0.16	93	0.09	0.60	21	0.00	0.00

TABLE 77

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
SUCCESSFULLY FILLED TEETH BY SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X}$ = 0.83)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	0.69	1.16	424	0.99	1.41	184	0.84	1.32
Metropolitan	378	0.68	1.17	253	0.98	1.42	135	0.88	1.36
Metro Males	194	0.60	1.13	131	0.84	1.30	78	0.95	1.41
Metro Females	184	0.77	1.20	122	1.12	1.52	57	0.79	1.29
Non-Metropolitan	138	0.72	1.14	171	1.00	1.41	49	0.73	1.19
Non-Metro Males	65	0.62	1.01	78	0.85	1.36	28	0.43	0.84
Non-Metro Females	73	0.81	1.24	93	1.14	1.45	21	1.14	1.46

TABLE 78

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
PERMANENT TEETH FILLED AND NEEDING FURTHER CARE BY
SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X} = 0.06$)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	0.05	0.26	424	0.07	0.30	184	0.05	0.22
Metropolitan	378	0.05	0.27	253	0.08	0.33	135	0.04	0.21
Metro Males	194	0.04	0.24	131	0.10	0.35	78	0.04	0.19
Metro Females	184	0.06	0.30	122	0.06	0.31	57	0.05	0.22
Non-Metropolitan	138	0.04	0.24	171	0.05	0.26	49	0.06	0.24
Non-Metro Males	65	0.05	0.21	78	0.02	0.23	28	0.00	0.00
Non-Metro Females	73	0.04	0.26	93	0.06	0.29	21	0.14	0.36

TABLE 79

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
TEETH WITH GINGIVITIS BY SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X} = 3.75$)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	3.46	3.13	424	3.72	3.33	184	4.59	3.75
Metropolitan	378	3.44	3.13	253	3.99	3.60	135	4.95	3.86
Metro Males	194	3.45	3.20	131	3.88	3.36	78	5.42	3.73
Metro Females	184	3.44	3.06	122	4.11	3.84	57	4.30	3.98
Non-Metropolitan	138	3.52	3.16	171	3.33	2.85	49	3.61	3.27
Non-Metro Males	65	4.22	3.47	78	3.78	3.11	28	3.78	3.61
Non-Metro Females	73	2.90	2.73	93	2.95	2.57	21	3.38	2.82

TABLE 80

MEANS AND STANDARD DEVIATIONS FOR PERIODONTAL INDEX
 BY SEX, LOCATION AND FLUORIDE STATUS
 FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
 (Total Sample $\bar{X} = 0.31$)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	0.29	0.27	424	0.30	0.28	184	0.38	0.30
Metropolitan	378	0.29	0.27	253	0.32	0.29	135	0.40	0.30
Metro Males	194	0.30	0.28	131	0.33	0.29	78	0.45	0.31
Metro Females	184	0.28	0.25	122	0.31	0.28	57	0.34	0.30
Non-Metropolitan	138	0.30	0.27	171	0.27	0.27	49	0.31	0.28
Non-Metro Males	65	0.37	0.30	78	0.32	0.30	28	0.34	0.31
Non-Metro Females	73	0.23	0.23	93	0.23	0.23	21	0.28	0.24

TABLE 81

MEANS AND STANDARD DEVIATIONS FOR ORAL HYGIENE INDEX
BY SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X} = 0.48$)

	N	Fluoride		N	Non-Fluoride		No Information		
		$\bar{X}$	SD		$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	0.91	0.50	424	0.96	0.54	184	1.11	0.51
Metropolitan	378	0.93	0.51	253	1.01	0.55	135	1.16	0.50
Metro Males	194	0.96	0.53	131	1.03	0.55	78	1.25	0.54
Metro Females	184	0.90	0.49	122	0.99	0.54	57	1.04	0.40
Non-Metropolitan	138	0.87	0.46	171	0.88	0.51	49	0.99	0.51
Non-Metro Males	65	0.97	0.49	78	0.95	0.56	28	0.98	0.51
Non-Metro Females	73	0.77	0.41	93	0.81	0.45	21	1.01	0.53

TABLE 82

SIGNIFICANT DIFFERENCES FOR SEX AND LOCATION BETWEEN
FLUORIDE STATUS GROUPS FOR SELECTED ORAL MORBIDITY MEASURES FOR
DECIDUOUS TEETH, FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977¹

Oral Measure	Total Sample	Metropolitan Only			Non-Metropolitan Only		
		Both Sexes	Males	Females	Both Sexes	Males	Females
Teeth present	+ *	+ *	+ *	+ *	+ *	+ *	
Sound teeth	+ *	+ *	+ *	+ *	+ *	+ *	+ *
dmf	- *	- *	- *	- *	- *		- *
Decayed teeth	- *	- *	- *		- *		
Teeth lost	- *	- *			- *		- *
Successfully filled teeth							
Filled needing further care	- *	- *	- *				

¹ An asterisk ('*') indicates that the mean value for a particular oral morbidity measure for the fluoride group is significantly different from the non-fluoride group. A minus sign (-) in front means the fluoride group has a significantly lower mean value. A plus sign (+) in front means a significantly higher mean value. Where there is no asterisk present the difference between the two groups was not significant using the criteria of the Student's t test.

TABLE 83

SIGNIFICANT DIFFERENCES FOR SEX AND LOCATION BETWEEN
FLUORIDE STATUS GROUPS FOR SELECTED ORAL MORBIDITY MEASURES FOR
PERMANENT TEETH, FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

Oral Measure	Total Sample	Metropolitan Only			Non-Metropolitan Only		
		Both Sexes	Males	Females	Both Sexes	Males	Females
Teeth present	- *	- *		- *			
Sound teeth							
DMF	- *	- *	- *	- *	- *		- *
Decayed teeth	- *	- *		- *			- *
Teeth lost	- *	- *	- *				
Successfully filled teeth	- *	- *		- *			
Filled needing further care							
Gingivitis		- *					
Perio index							
OHI							

TABLE 84

MEANS AND STANDARD DEVIATIONS FOR RATIO OF
ALL TREATMENT OVER ALL TREATMENT EVER NEEDED FOR DECIDUOUS TEETH
BY SEX, LOCATION AND FLUORIDE STATUS FOR 8 - 9 YEAR OLDS

ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 0.93$)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	0.94	0.17	424	0.92	0.18	184	0.92	0.18
Metropolitan	378	0.94	0.17	253	0.93	0.18	135	0.92	0.19
Metro males	194	0.94	0.17	131	0.92	0.19	78	0.88	0.23
Metro females	184	0.94	0.17	122	0.94	0.16	57	0.96	0.11
Non-metropolitan	138	0.93	0.17	171	0.92	0.19	49	0.93	0.15
Non-metro males	65	0.92	0.18	78	0.90	0.21	28	0.93	0.15
Non-metro females	73	0.95	0.17	93	0.94	0.17	21	0.92	0.15

TABLE 85

MEANS AND STANDARD DEVIATIONS FOR RATIO OF
SUCCESSFUL TREATMENT OVER ALL TREATMENT EVER NEEDED FOR DECIDUOUS TEETH
BY SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977
(Total Sample $\bar{X} = 0.90$)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	0.91	0.20	424	0.90	0.21	184	0.88	0.22
Metropolitan	378	0.92	0.20	253	0.90	0.20	135	0.88	0.23
Metro males	194	0.92	0.19	131	0.88	0.22	78	0.85	0.25
Metro females	184	0.92	0.20	122	0.93	0.18	57	0.91	0.20
Non-metropolitan	138	0.90	0.22	171	0.89	0.22	49	0.90	0.22
Non-metro males	65	0.88	0.21	78	0.87	0.24	28	0.91	0.21
Non-metro females	73	0.91	0.22	93	0.90	0.19	21	0.86	0.23

TABLE 86

MEANS AND STANDARD DEVIATIONS FOR RATIO
OF ALL TREATMENT RECEIVED OVER ALL TREATMENT EVER NEEDED
FOR PERMANENT TEETH BY SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 0.96$)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	0.97	0.13	424	0.95	0.16	184	0.95	0.16
Metropolitan	378	0.97	0.12	253	0.95	0.15	135	0.95	0.16
Metro males	194	0.97	0.11	131	0.95	0.15	78	0.95	0.16
Metro females	184	0.96	0.13	122	0.95	0.15	57	0.95	0.15
Non-metropolitan	138	0.97	0.14	171	0.95	0.16	49	0.95	0.15
Non-metro males	65	0.94	0.17	78	0.96	0.14	28	0.96	0.14
Non-metro females	43	0.98	0.09	93	0.94	0.17	21	0.94	0.16

TABLE 87

MEANS AND STANDARD DEVIATIONS FOR RATIO
OF SUCCESSFUL TREATMENT OVER ALL TREATMENT EVER NEEDED
FOR PERMANENT TEETH BY SEX, LOCATION AND FLUORIDE STATUS
FOR 8 - 9 YEAR OLDS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 0.95$)

	Fluoride			Non-Fluoride			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	516	0.96	0.13	424	0.94	0.16	184	0.95	0.16
Metropolitan	378	0.96	0.13	253	0.94	0.16	135	0.95	0.15
Metro males	194	0.96	0.12	131	0.94	0.16	78	0.95	0.15
Metro females	184	0.95	0.14	122	0.94	0.16	57	0.95	0.14
Non-metropolitan	138	0.96	0.14	171	0.95	0.16	49	0.93	0.18
Non-metro males	65	0.95	0.15	78	0.97	0.13	28	0.96	0.14
Non-metro females	73	0.97	0.13	93	0.94	0.18	21	0.89	0.21

CHAPTER TWO

INTER-COUNTRY COMPARISON OF CHILDREN

Background

One of the unique features of the International Collaborative Study is that rigorous standardization procedures were instituted so that the cross-national clinical data would be comparable. For the Ontario replication the calibration techniques and standards of the W.H.O. were closely followed. For this reason the researchers are fairly confident that if any of the dental teams from the other countries examined the Ontario sample that they would arrive at the same clinical findings and vice versa. Thus, the situation lends itself to cross-country comparisons of oral health status.

Findings

Tables 88 to 91 present selected oral morbidity measures for the five ICS countries, the American (Baltimore) and the Canadian (Ontario) replications.

As for dmf (deciduous teeth), (Table 88) with 3.07 Ontario has the lowest rate next to Baltimore (2.23). For the number of decayed deciduous teeth, Ontario is third after New Zealand (0.12) and Baltimore (0.92). At this point it should be noted that both New Zealand and Norway have a special dental service for children. The difference, however, is that in New Zealand both deciduous and permanent teeth are treated whereas in Norway the priority is permanent teeth. The figures for decayed deciduous teeth are certainly indicative of this policy. For deciduous teeth lost to caries, again Ontario has the second lowest number (0.26) after Baltimore (0.11). Turning to number of deciduous

teeth successfully filled, Ontario is higher than all countries except Japan and New Zealand. However, the differences are less than one tooth and for all but Baltimore less than half a tooth. For number of deciduous teeth filled and needing further care, Ontario again is the lowest (0.20) after Baltimore (0.10).

Selected oral morbidity measures for permanent teeth are contained in Tables 89 and 90. For DMF, Ontario is second lowest (1.55) again to Baltimore (0.73). For decayed teeth, Norway and New Zealand with their dental programmes and Baltimore have a lower mean number of decayed teeth than those in Ontario (0.64). Ontario has a higher average number of permanent teeth lost to caries than all the countries but Australia and Norway. However, the inter-country figures are not remarkably different and the means for all the countries are less than one-tenth of a tooth. For both numbers of permanent teeth successfully filled and requiring further care, Ontario again is second lowest to Baltimore.

Ontario has the lowest gingivitis and periodontal index of all countries. The oral hygiene scores were very similar to New Zealand's and only slightly higher than the United States' scores.

For the treatment need ratios as indicated in Table 91, Ontario has the highest ratio of successful treatment of deciduous teeth next to New Zealand (0.90 vs. 0.94). For permanent teeth this ratio for Ontario (0.95) is higher than the other countries. Turning to the ratio of teeth needing retreatment to total treatment provided, for deciduous teeth, Ontario had a lower ratio (0.03) than all the other countries. For permanent teeth, Ontario is lower (0.06) than all but the United States, New Zealand and Australia.

TABLE 88

MEANS FOR SELECTED ORAL MORBIDITY MEASURES FOR
DECIDUOUS TEETH BY SEX AND LOCATION FOR
8 - 9 YEAR OLDS BY STUDY AREA

	Study Areas						
	Aust.	F.R.G.	Jap.	N.Z.	Nor.	U.S.A.	Canada (Ontario)
<u>Total Caries Experience (dmf)</u>							
Total	4.09	5.56	7.20	6.34	7.25	2.23	3.07
Metro Males	3.84	5.86	7.14	6.65	7.36	2.06	3.34
Non-Metro Males	4.09	5.81	7.96	6.47	7.76	2.40	3.14
Metro Females	4.38	5.25	6.67	6.19	6.95	2.10	2.83
Non-Metro Females	4.06	5.34	7.48	6.02	6.89	2.50	2.91
<u>Number of Decayed Teeth</u>							
Total	1.78	2.36	3.99	0.12	3.58	0.92	0.97
Metro Males	1.81	2.34	3.38	0.13	3.30	3.30	1.01
Non-Metro Males	1.79	2.76	5.88	0.10	4.12	0.80	1.01
Metro Females	1.78	2.18	3.02	0.15	3.20	1.02	0.94
Non-Metro Females	1.74	2.14	4.82	0.10	3.69	0.79	0.88
<u>Number of Teeth Lost to Caries</u>							
Total	0.93	1.05	1.03	0.29	1.66	0.11	0.26
Metro Males	0.72	1.13	0.94	0.40	1.57	0.11	0.26
Non-Metro Males	0.92	1.13	1.17	0.21	1.81	0.01	0.20
Metro Females	1.12	0.94	0.92	0.34	1.67	0.08	0.29
Non-Metro Females	0.95	0.99	1.24	0.23	1.61	0.16	0.24
<u>Number of Successfully Filled Teeth</u>							
Total	1.22	1.44	1.64	5.65	1.46	1.10	1.64
Metro Males	1.15	1.50	2.22	5.81	1.73	0.83	1.83
Non-Metro Males	1.18	1.28	0.53	5.86	1.42	1.43	1.77
Metro Females	1.29	1.38	2.21	5.42	1.57	0.88	1.40
Non-Metro Females	1.24	1.61	0.82	5.49	1.12	1.49	1.59
<u>Number of Filled Teeth Needing Further Care</u>							
Total	0.51	0.72	0.53	0.28	0.54	0.10	0.20
Metro Males	0.58	0.89	0.59	0.32	0.75	0.10	0.22
Non-Metro Males	0.54	0.64	0.37	0.30	0.41	0.08	0.17
Metro Females	0.45	0.76	0.53	0.28	0.51	0.13	0.20
Non-Metro Females	0.49	0.60	0.60	0.21	0.47	0.07	0.20

TABLE 89

MEANS FOR SELECTED ORAL MORBIDITY MEASURES FOR
PERMANENT TEETH BY SEX AND LOCATION FOR
8 - 9 YEAR OLDS BY STUDY AREA

	Study Areas						
	Aust.	F.R.G.	Jap.	N.Z.	Nor.	U.S.A.	Canada (Ontario)
<u>Total Caries Experience (DMF)</u>							
Total	2.28	3.29	2.87	3.27	4.06	0.73	1.55
Metro Males	2.11	3.14	2.55	3.21	3.93	0.64	1.49
Non-Metro Males	2.24	3.12	2.97	3.09	3.88	0.60	1.24
Metro Females	2.43	3.50	2.87	3.47	4.12	0.77	1.61
Non-Metro Females	2.31	3.41	3.30	3.32	4.35	0.96	1.83
<u>Number of Decayed Teeth</u>							
Total	1.26	1.64	1.36	0.23	0.41	0.33	0.64
Metro Males	1.28	1.60	0.93	0.26	0.30	0.35	0.66
Non-Metro Males	1.32	1.77	2.00	0.28	0.42	0.20	0.53
Metro Females	1.29	1.58	1.07	0.18	0.30	0.37	0.64
Non-Metro Females	1.18	1.60	1.94	0.20	0.64	0.35	0.72
<u>Number of Teeth Lost to Caries</u>							
Total	0.06	0.02	0.00	0.00	0.10	0.01	0.04
Metro Males	0.04	0.00	0.00	0.00	0.07	0.01	0.03
Non-Metro Males	0.06	0.03	0.01	0.00	0.08	0.00	0.00
Metro Females	0.06	0.03	0.00	0.00	0.11	0.01	0.05
Non-Metro Females	0.08	0.03	0.00	0.00	0.17	0.02	0.05
<u>Number of Successfully Filled Teeth</u>							
Total	0.86	1.00	1.16	2.90	3.25	0.42	0.83
Metro Males	0.70	0.91	1.31	2.81	3.33	0.33	0.75
Non-Metro Males	0.79	0.89	0.70	2.67	3.04	0.41	0.69
Metro Females	0.95	1.05	1.43	3.16	3.45	0.40	0.89
Non-Metro Females	0.95	1.16	0.89	2.95	3.19	0.59	1.01
<u>Number of Filled Teeth Needing Further Care</u>							
Total	0.10	0.64	0.36	0.16	0.32	0.01	0.06
Metro Males	0.09	0.63	0.33	0.16	0.27	0.01	0.06
Non-Metro Males	0.08	0.47	0.26	0.16	0.36	0.00	0.03
Metro Females	0.13	0.84	0.37	0.14	0.27	0.02	0.06
Non-Metro Females	0.11	0.62	0.47	0.19	0.37	0.01	0.06

TABLE 90

MEANS FOR SELECTED ORAL MORBIDITY MEASURES FOR
PERMANENT TEETH BY SEX AND LOCATION FOR
8 - 9 YEAR OLDS BY STUDY AREA

	Study Areas						
	Aust.	F.R.G.	Jap.	N.Z.	Nor.	U.S.A.	Canada (Ontario)
<u>Number of Teeth with Gingivitis</u>							
Total	8.77	9.22	5.97	6.54	7.73	5.28	3.75
Metro Males	8.33	8.50	5.41	6.31	8.22	5.66	3.97
Non-Metro Males	9.10	9.69	7.00	6.59	7.53	4.69	3.95
Metro Females	8.11	8.50	4.99	6.48	7.92	5.90	3.80
Non-Metro Females	9.25	10.26	7.57	6.82	7.21	4.37	2.98
<u>Periodontal Index (PI)</u>							
Total	0.87	0.79	0.52	0.62	0.72	0.50	0.31
Metro Males	0.85	0.78	0.43	0.61	0.82	0.56	0.34
Non-Metro Males	0.95	0.86	0.74	0.65	0.73	0.48	0.34
Metro Females	0.76	0.68	0.34	0.58	0.71	0.54	0.30
Non-Metro Females	0.90	0.83	0.73	0.65	0.61	0.40	0.24
<u>Oral Hygiene Index (OHI-S)</u>							
Total	1.53	1.54	1.76	0.97	1.34	0.85	0.96
Metro Males	1.65	1.60	2.00	1.02	1.40	0.94	1.04
Non-Metro Males	1.55	1.57	1.54	0.95	1.44	0.77	0.96
Metro Females	1.52	1.54	1.78	0.98	1.21	0.90	0.95
Non-Metro Females	1.44	1.44	1.56	0.94	1.29	0.71	0.82

TABLE 91

MEANS FOR SELECTED TREATMENT NEED MEASURES FOR
PERMANENT AND DECIDUOUS TEETH BY SEX AND LOCATION FOR
8 - 9 YEAR OLDS BY STUDY AREA

	Aust.	F.R.G.	Jap.	Study Areas			U.S.A.	Canada (Ontario)
				N.Z.	Nor.			
Ratio of Successful Treatment to Total Need for Treatment - Deciduous								
Total	0.52	0.37	0.31	0.94	0.28		0.69	0.90
Metro Males	0.53	0.35	0.40	0.93	0.31		0.65	0.89
Non-Metro Males	0.49	0.32	0.10	0.94	0.24		0.74	0.88
Metro Females	0.51	0.38	0.43	0.93	0.33		0.63	0.92
Non-Metro Females	0.54	0.41	0.16	0.95	0.24		0.78	0.90
Ratio of Successful Treatment to Total Need for Treatment - Permanent								
Total	0.51	0.35	0.47	0.88	0.83		0.82	0.95
Metro Males	0.47	0.33	0.58	0.87	0.86		0.80	0.96
Non-Metro Males	0.53	0.33	0.29	0.85	0.81		0.88	0.96
Metro Females	0.47	0.35	0.54	0.90	0.88		0.80	0.95
Non-Metro Females	0.54	0.38	0.31	0.88	0.78		0.81	0.94
Ratio of Teeth Needing Retreatment to Total Treatment Provided - Deciduous								
Total	0.06	0.25	0.17	0.04	0.14		0.04	0.03
Metro Males	0.05	0.30	0.19	0.05	0.18		0.05	0.03
Non-Metro Males	0.07	0.23	0.13	0.04	0.12		0.03	0.02
Metro Females	0.07	0.28	0.15	0.04	0.15		0.04	0.02
Non-Metro Females	0.04	0.20	0.20	0.04	0.12		0.02	0.03
Ratio of Teeth Needing Retreatment to Total Treatment Provided - Permanent								
Total	0.05	0.26	0.14	0.05	0.08		0.01	0.06
Metro Males	0.05	0.26	0.12	0.04	0.07		0.01	0.06
Non-Metro Males	0.03	0.20	0.12	0.04	0.10		0.00	0.05
Metro Females	0.06	0.31	0.14	0.05	0.07		0.01	0.05
Non-Metro Females	0.05	0.24	0.20	0.05	0.10		0.00	0.05

Treatment/Need Ratios

The treatment/need ratios were designed by the W.H.O. research staff as one means of evaluating the effectiveness of a country's dental health services in meeting the general dental needs of the population in various age groups. However, in our analysis of the treatment need ratios for the Ontario replication we found that these may present a biased view of the system because these measures are subject to statistical artifacts. For example, the measures are calculated individually for each component and for each person and then averaged. This would mean that if the sample group were not relatively homogeneous with regard to disease level and treatment level, the discrepancy between the cases at either end of the range would be compounded. In addition, these measures are biased in favour of those with a high disease rate. Those with fifteen untreated caries and DMF of 15 and no other work done, receive the same score as those with one untreated lesion and a DMF of one. In addition, a country with a low disease level and the same average number of untreated caries as a country with a high disease level receives a lower treatment need ratio than the latter country simply because untreated caries are a higher proportion of the treatment needed. We would suggest that there are a couple of alternatives which could be implemented to circumvent the problem of statistical artifacts. First, instead of calculating each component separately for each individual and then averaging, it is suggested that each component be averaged for the sample and then the average of the

components combined to form the ratio.

The following examples illustrate this procedure. One of the ratios is successful treatment to all treatment needed. Operationally defined this is equal to successfully filled teeth over successfully filled teeth plus decayed teeth plus teeth filled and needing further treatment.

Three cases will be used to discuss this ratio. In each of these cases, the portion "filled and needing further treatment" has been equated to zero for simplicity of discussion.

Each case has been chosen so that the total number of successfully filled teeth for the three samples is equal to nine. The total number of decayed teeth is six. However, the distribution within the sample has been varied.

The three cases have nine successfully filled teeth and six decayed teeth giving a total sample ratio of 0.60 for each of the cases.

In Case #1, the number of successfully filled teeth and the number of decayed teeth has been rather evenly distributed across the sample. Thus the individual ratios have a narrow range. When averaged, the overall ratio is 0.61 which varies very slightly from the total sample ratio of 0.60.

In Case #2, the individuals in the sample have the same distribution of decay as the individuals in Case #1. However, the successfully filled numbers vary. Individual C has had rampant caries but has been quite successfully treated according to the

Case #1

Individual	Successfully Filled	Decayed	Individual Ratio
A	2	1	0.67
B	3	2	0.60
C	4	3	0.57
Total	9	6	
Total sample ratio	0.60	Average of ratios 0.61	

Case #2

Individual	Successfully Filled	Decayed	Individual Ratio
A	0	1	0.00
B	0	2	0.00
C	9	3	0.75
Total	9	6	
Total sample ratio	0.60	Average of ratios 0.25	

Case #3

Individual	Successfully Filled	Decayed	Individual Ratio
A	2	0	1.00
B	3	0	1.00
C	4	6	0.40
Total	9	6	
Total sample ratio	0.60	Average of ratios 0.80	

individual ratio of 0.75. Individuals A and B while having absolute decay values the same as Case #1, have markedly differing ratios. This is due to the fact that they have had a good history of no decay and were thus not in need of treatment. As a result when the individual ratios are averaged, the new figure is 0.25 which drastically differs from the total sample ratio of 0.60.

In Case #3, individuals A and B have had excellent treatment success. However, individual C has had a very poor record according to the individual ratio of 0.40. This is then minimized when the individual ratios are averaged. The new ratio is 0.80 which is much better than the total sample ratio of 0.60.

In these three cases when the raw data of the total sample was used, the ratio was 0.60. When the individual ratios were averaged the new ratios were 0.61, 0.25 and 0.80 which are drastically different. These values do not present a clear picture of the total sample. The raw data of the total sample should be used if indeed one desires to see how well the needs of the population as a whole have been met. Averaging ratios can be very misleading as illustrated by Case #2.

The second alternative would be to compare countries on other forms of treatment need variables. Tables 92 to 94 suggest some of the additional measures which could be used.

TABLE 92

PERCENT DECAYED TEETH OF DMF (dmf) FOR
DECIDUOUS AND PERMANENT
8 - 9 YEAR OLDS BY COUNTRY

Country	% decayed deciduous of dmf	% decayed permanent of DMF
Australia	43.5	55.3
Germany	42.4	49.8
Japan	55.4	47.4
New Zealand	1.9	7.0
Norway	49.4	10.1
U.S.A.	41.3	45.2
Canada	31.6	41.3

Next to New Zealand (1.9%), (which has a children's dental service) Canada has the lowest percentage of decayed deciduous teeth (31.6%). The same trend is evident in permanent teeth where Canada (41.3%) follows the two countries with dental services (7.0% and 10.1%).

TABLE 93

PERCENT DECAYED TEETH (NEVER MET NEED) ARE OF
TOTAL TREATMENT NEED FOR
DECIDUOUS AND PERMANENT TEETH FOR 8 - 9 YEAR OLDS BY COUNTRY

<u>Country</u>	<u>% Never Met Need (Deciduous)</u>	<u>% Never Met Need (Permanent)</u>
Australia	50.7	56.8
Germany	52.2	50.0
Japan	64.8	47.2
New Zealand	2.0	7.0
Norway	64.2	10.3
U.S.A.	43.4	43.4
Canada	34.5	41.8

This table presents data with the components averaged first and then combined.

After New Zealand (2.0%) in deciduous teeth Canada has the lowest never met need (34.4%), and for permanent teeth Canada (41.8%) follows New Zealand and Norway (7.0% and 10.3%).

Table 94 uses the same rational as Table 93 to describe successful treatment.

TABLE 94

PERCENT SUCCESSFUL TREATMENT IS OF
TOTAL TREATMENT NEED FOR DECIDUOUS AND PERMANENT TEETH FOR
8 - 9 YEAR OLDS BY COUNTRY

<u>Country</u>	<u>% successful treatment (deciduous)</u>	<u>% successful treatment (permanent)</u>
Australia	34.8	38.7
Germany	31.9	30.5
Japan	26.6	40.3
New Zealand	93.4	88.1
Norway	26.2	81.7
U.S.A.	51.9	55.3
Canada	58.4	54.2

Canada (58.4%) is next highest after New Zealand (93.4%) in terms of successful treatment for deciduous teeth. For permanent teeth, Canada (54.2%) and the United States (55.3%) are almost equal and both are lower than New Zealand and Norway (88.1% and 81.7%)

Summary

The findings from these dental surveys seem to indicate that Ontario has a relatively low disease rate compared to the other study countries. There are several factors which could contribute to this. First, almost half of the child sample was born in a fluoride area and from the previous chapter, fluoride area children were found to have significantly fewer (dmf) (DMF) teeth than non-fluoride area children. None of the other countries, except the United States, where the total sample was from a fluoridated area and New Zealand, had a significant number of fluoridated water supply areas in their sample. The other factor contribution to the relatively good oral health status of the Ontario children might be the oral hygiene habits of the children themselves. The Ontario group has lower gingivitis, periodontal index, calculus and debris scores than most of the other countries. Indirectly, this might indicate that the children have better dental habits than children in other countries but as no direct questions about this aspect of dental health were asked, this supposition is just speculation.

CHAPTER THREE

INTRA - SAMPLE COMPARISON OF 13 AND 14 YEAR OLD STUDENTS

Background

There was a target number of 1,000 for the 13 and 14 year old students. This number was proportioned among the four centres in the same manner as the children's sample. Table 95 illustrates the distribution of the 936 students examined and questioned in the various study areas. Table 96 lists the number of schools visited in each area. It should be noted that additional schools had to be chosen in Oshawa because of the high number of students over the age of 13-14 years in the grades sampled.

Almost half of the student examinations were done by Dr. Hunt as indicated in Table 97 because the Chief Epidemiologist was required to re-examine every tenth student to check for consistency between himself and the other examiners.

There were 441 (47.1%) males and 495 (52.9%) females in the sample. Over 70 percent of the sample resided in Metropolitan areas. Almost 90 percent were native born Canadians. The mean age of the sample was 14.0 years but as is indicated in Table 98 each study site had a slightly different mean age. The range for the sample was 8.4 months.

In categorizing the respondents according to exposure to fluoride, 54.3 percent were born and spent the first five years of their life in a fluoride area, whereas 31.8 percent were neither born nor raised in a fluoride area. For the remainder of the sample either no information was available or they had lived in both fluoride and non-fluoride areas during their formative years.

The next sections of the chapter will review some of the findings on selected oral morbidity measures for the entire sample. Subsequent sections will look at sex, location, study area, and fluoride status subgroups.

Oral Morbidity in the Total Sample

By age 13-14 the primary teeth have been shed and have been replaced by the permanent dentition. The mean number of teeth present for this group is 26.87 (Table 99). Of the teeth present an average of 22.03 were sound, 1.01 were decayed, 2.96 were successfully filled, 0.23 were filled and needed further care and 0.15 were missing due to caries. These combine to give a DMF score of 4.32 teeth. The younger age groups with a mean age of 9.00 years had 3.07 DMF teeth. This means that from age 9 to 14 an average Ontario child gained 0.56 teeth each year.

The oral hygiene measures are all reasonably low. The average student had 6.50 teeth with gingivitis. The debris index was 0.68, the calculus index was 0.13 and the oral hygiene index was 0.81 (Table 99). The periodontal index was 0.26.

The distribution on oral hygiene indicators as presented in Table 100 indicates that a reasonably high standard of oral hygiene exists. In a later chapter this will be investigated in terms of actual dental habits (e.g. toothbrushing, flossing, mouthwash, etc.).

The 13-14 year old students were assessed in terms of orthodontic needs. Tables 101 and 102 present the findings from this assessment.

Eighteen separate assessments of dentofacial anomalies were made (Table 101). The most common anomaly was some departure from normal of the anteroposterior molar relationship (35.7 percent) followed by anterior irregularities (30.2 percent), crowding (28.1 percent) and midline deviation (21.5 percent).

In terms of treatment required, 25.4 percent needed corrective treatment and 8.0 percent needed preventive care. Two percent had the treatment completed and treatment was in progress for 8.9 percent. However, 26.4 percent were in need of treatment (Table 102).

The treatment needed other than for orthodontics is described in Table 103. An average of 1.23 teeth per person required some restoration and 0.07 teeth needed extraction.

A further perspective on treatment needed is contained in Tables 104 and 105. Fifty-three point three percent of the sample had no decayed teeth; 14.1 percent had no DMF teeth. Forty-nine percent of the students had no treatment requirements (Table 105).

Differences in Oral Morbidity by Selected Characteristics

There are a number of characteristics which could be assumed to affect oral health status. As with the children's data the ones identified for analysis are sex, location (metropolitan vs. non-metropolitan), study area, and fluoride status.

Sex and Location

Description of Findings

Table 106 indicates that there were minimal differences among

the various subgroups in number of teeth present. The metropolitan group had 26.86 teeth present and the non-metropolitan group had 26.89. Females in both locations had more teeth present (26.92, 26.98 vs. 26.80, 26.80). The non-metropolitan females had fewer sound teeth than the males.

The metropolitan group had fewer DMF teeth (4.02) than the non-metropolitan group (5.02) and females had a higher number of DMF teeth than males in both locations.

Differences in decayed teeth were not significant in comparing the metropolitan and non-metropolitan groups. The sex differences for decayed teeth were also insignificant. Metro females had more decayed teeth than metro males (1.05 vs. 0.94) but the opposite was true in the non-metropolitan areas (1.00 vs. 1.12).

As shown in Table 107, the non-metropolitan group had significantly more successfully filled teeth (3.60) than the metropolitan group (2.69). Females in both locations had more successfully filled teeth than the males.

The non-metropolitan group had slightly more teeth needing further treatment (0.24) than the metropolitan (0.22). Non-metro males had 0.27 teeth needing retreatment compared to 0.22 for non-metro females.

In terms of missing teeth again those in the non-metropolitan areas have more than their non-metropolitan counterparts but the differences are not significant. Females had marginally more missing teeth than males.

Tables 108 and 109 present the findings related to various oral hygiene measures according to sex and location. The metropolitan and

non-metropolitan groups had equal numbers of teeth with gingivitis. In both locations males had higher scores than females.

The Debris, Calculus and Oral Hygiene Indices showed similar patterns to each other. The metropolitan group had higher scores than the non-metropolitan group and the males in both locations had higher scores than the females.

As Table 109 indicates periodontitis is virtually non-existent among this age group. In turn the average periodontal index is very low.

Table 110 indicates the need for treatment. The non-metropolitan group needs for treatment (1.34 teeth) is not significantly greater than the metropolitan (1.28 teeth). Females in the metropolitan area require slightly more treatment than males (1.31 vs. 1.25). while females in the non-metropolitan area require less than the males in the same location (1.25 vs. 1.44).

Table 111 presents the treatment/need ratios for this age group. There are virtually no differences by sex or location on any of these indicators. The mean value of all treatment received over all treatment required is 0.90; for successful treatment it is 0.87 and for failed treatment, 0.06. These figures seem to indicate that the quality of dental care in Ontario is consistently high regardless of sex or location.

Study Areas

Table 115 presents the number of teeth present by study area. There are very few differences among the four sites. Toronto has the lowest mean number of teeth and Oshawa the highest number but the

differences are less than one tooth and correspond to the fact that Toronto students had a lower mean age than Oshawa students (see Table 98). Females had more teeth than males except in Metropolitan Oshawa. This corresponded with other developmental differences at this age group, but it is worth noting that the sex differences in teeth present were not as great as those seen in the 8-9 year olds.

In the metropolitan areas Oshawa had the highest number of sound teeth (23.16) and Thunder Bay had the lowest (20.27) (Table 116). For non-metropolitan areas Thunder Bay had the highest number of sound teeth (24.00) and Toronto had the lowest number (18.71). It is worth noting that the difference between males and females in non-metro Toronto was marked (almost 9 teeth) but the reader is cautioned in generalizing from this because of the small sample.

Toronto had the lowest DMF index for Metropolitan areas (3.34) and Thunder Bay at 6.45 had the highest DMF index (Table 117). The reverse was true for the non-metropolitan areas. There was no consistent pattern between the sexes in terms of DMF but the reader is asked again to note the marked difference between males and females in non-metro Toronto.

Cornwall and Thunder Bay in both metropolitan and non-metropolitan areas have a higher number of decayed teeth than Toronto and Oshawa (Table 118). There was no consistent pattern of sex differences.

Residence in Areas of Fluoride Drinking Water

As with the children's sample, fluoride was expected to have an impact on the oral health status of the 13-14 year olds. Tables 128 to

142 present the findings on selected oral morbidity measures by residence/non-residence in areas where the drinking water was fluoridated. Because additional information was available from the student questionnaire, it was possible to categorize the sample according to where they lived and where they spent the first five years of their life. However, to simplify the analysis and description of the findings, only those born and raised in a fluoride area will be compared with those born and raised in a non-fluoride area.

Student's t test was used to evaluate whether the differences between these two groups were significant. Only those differences which were statistically significant will be discussed. There was no significant difference in the number of teeth present in the fluoride or non-fluoride areas (26.83) (Table 128). Those born and raised in fluoride areas had a mean number of 22.30 sound teeth compared to 21.70 sound teeth for those born and raised in non-fluoride areas (Table 129).

Students born and raised in the fluoride areas had 3.72 DMF teeth. Those in the non-fluoride areas had 4.94 DMF teeth, a significantly higher number (Table 130). The metropolitan fluoride group had significantly lower mean DMF of 2.89 than the non-metropolitan group (4.18). The non-metropolitan females had a higher mean DMF of 4.74 than any other subgroup of those born and raised in a fluoride area. The fluoride group had fewer decayed teeth (0.8) than the non-fluoride group (1.19). Within the fluoride group the metropolitan females had a greater difference in decayed teeth compared to their non-fluoride counterparts (0.66 vs. 1.94) than any other grouping. Approximately twice as many

teeth were lost due to dental caries by students born and raised in the non-fluoride areas ($\bar{X} = 0.22$) compared to those born and raised in fluoride areas ($\bar{X} = 0.09$) (Table 132).

The fluoride group had significantly fewer filled teeth than the non-fluoride most of which were in the successfully filled category ($\bar{X} = 2.67$ vs. $\bar{X} = 3.31$) (Table 133). In terms of subgroups within the sample, the metropolitan group and the metro males in the fluoride area have significantly lower means than their counterparts in the non-fluoride areas.

The comparative oral health indicators for groups on fluoride and non-fluoride areas are shown in tables 135 to 140. There are no significant differences in the debris index when the total groups or the subgroups born and raised in the fluoride areas are compared with their non-fluoride born and raised counterparts (Table 135). The mean calculus index of the metropolitan females born and raised in fluoride areas is significantly lower than that of the metropolitan females born and raised in non-fluoride areas (Table 136). However, the calculus index itself is very low. The resultant oral hygiene index has a mean of 0.79 for the group born and raised in fluoride areas and 0.88 for those born and raised in non-fluoride areas (Table 137). The difference in the mean number of teeth with gingivitis (0.53) is not significant for the group born and raised in the fluoride areas ($\bar{X} = 6.50$) and those born and raised in non-fluoride areas ($\bar{X} = 5.97$) (Table 138). The only significant finding in the periodontal index (Table 139) was found in the non-fluoride non-metropolitan group which had a lower index ($\bar{X} = 0.20$) than the fluoride non-metropolitan group ($\bar{X} = 0.29$).

When effects of fluoride in other studies are considered, one may have expected to find greater differences in the numbers of decayed, missing and filled teeth in fluoride and non-fluoride influenced subjects than was actually present. However, since the DMF indices for the non-fluoride influenced group were also lower than most of the other countries in the W.H.O. study, other influences such as the receipt of fluoride supplements, fluoride treatments by this latter group may have narrowed the expected DMF difference with the fluoride group.

Analysis of Differences

In order to evaluate whether any of the trends in the oral morbidity measures presented significant differences by sex or location, student's t tests were used.

There were no significant differences by sex or location for number of teeth present. However, the metropolitan group had significantly more sound teeth present than the non-metropolitan group. Likewise, non-metro males had more sound teeth than non-metro females. In terms of DMF teeth the metropolitan group had significantly fewer DMF teeth than the non-metropolitan group, as did the non-metro males as compared with the females in the same location. These differences between groups seem to be accounted for by differences in number of teeth successfully filled as there are no other statistically significant differences on any other components of the DMF index.

Turning to oral hygiene scores males in both locations have significantly more teeth affected by gingivitis than females. The same pattern follows with the calculus index, oral hygiene index and periodontal index. The debris index is the only exception where there

is no significant difference between males and females in the non-metropolitan area. In addition, unlike the other oral hygiene indicators those in the metropolitan areas have significantly higher debris scores than those in the non-metropolitan areas.

Because the student's t test cannot separate the compounding effects of sex and location on a particular measure, analysis of variance was run on the same set of oral morbidity measures. The levels of significance are presented in Tables 112, 113, and 114. Location was significant for number of sound teeth, DMF, number of decayed teeth and the oral hygiene index. On the other hand, sex was a significant factor in differences in DMF, number of decayed teeth, number of teeth with gingivitis, debris index, calculus index, oral hygiene index, and both the periodontal indices. In short, location is not as powerful a factor as is sex and sex appears to be mostly related to oral hygiene indicators and to developmental age.

Summary

Some of the important findings from the analysis of the 13 and 14 year old student's oral examination data were as follows:

- 1) The mean number of DMF teeth for the total sample was 4.32.
- 2) The scores of the debris, calculus, oral hygiene and periodontal indices were low in comparison to those of students in other countries.
- 3) Forty-nine percent of the student sample required no treatment for caries. Fourteen percent had no DMF teeth.

- 4) Eight percent of students needed preventive orthodontic treatment and 25.4 percent needed corrective treatment. Two percent of students had had their orthodontic treatment completed; 8.9 percent were receiving treatment and 26.4 percent needed treatment.
- 5) Location (metropolitan and non-metropolitan) and sex are both determinants of number of teeth affected by caries. For example, non-metropolitan females had 5.68 DMF teeth and metropolitan males had 3.83 DMF teeth.
- 6) Metropolitan students from the three fluoridated cities, Toronto, Oshawa and Cornwall had lower numbers of DMF teeth (3.34, 3.83, and 3.86) than those from the non-fluoridated city, Thunder Bay (6.45).
- 7) Students born and raised for at least 5 years in a community with fluoridated water had 3.72 DMF teeth and those born and raised in a non-fluoridated area had 4.94 DMF teeth.

TABLE 95

DISTRIBUTION BY NUMBER AND PERCENT OF
STUDENTS EXAMINED BY SAMPLING AREA,
ONTARIO SAMPLE, 1977

<u>Area</u>	<u>N</u>	<u>%</u>
Toronto	275	29.4
York County	17	1.8
Oshawa	194	20.7
Durham Region	141	15.1
Cornwall	91	9.7
Stormont County	97	10.4
Thunder Bay	97	10.4
Thunder Bay District	24	2.6
Total	936	100.0

TABLE 96

DISTRIBUTION BY NUMBER AND PERCENT OF
SCHOOLS VISITED BY SAMPLING AREA, ONTARIO SAMPLE, 1977

	<u>N</u>	<u>%</u>
Toronto	13	33.3
York County	1	2.6
Oshawa	7	17.9
Durham Region	3	7.7
Cornwall	3	7.7
Stormont County	4	10.2
Thunder Bay	7	17.9
Thunder Bay District	1	2.6
Total	39	100.0

TABLE 97

DISTRIBUTION BY NUMBER AND PERCENT OF
EXAMINATIONS COMPLETED FOR STUDENTS BY EXAMINER, ONTARIO SAMPLE, 1977

	<u>N</u>	<u>%</u>
Hunt	437	46.7
Hausmanis	141	15.1
Krupanszky	259	27.7
Reiha	56	6.0
Ellis	43	4.6
Total	936	100.0

TABLE 98

MEAN AGE IN YEARS BY LOCATION FOR
13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

<u>Location</u>	<u>Mean Age</u>
<u>Toronto</u>	
Metropolitan	13.8
Non Metropolitan	13.8
<u>Oshawa</u>	
Metropolitan	14.4
Non-Metropolitan	14.4
<u>Cornwall</u>	
Metropolitan	13.7
Non-Metropolitan	13.7
<u>Thunder Bay</u>	
Metropolitan	14.2
Non-Metropolitan	14.2
<u>Total sample</u>	14.0

TABLE 99

DETAILED STATISTICS FOR ORAL MORBIDITY MEASURES¹ FOR
13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Central Tendency			Dispersion			Standard Error
	Mean	Median	Mode	S ²	SD	Range	
Number of teeth present	26.87	27.62	28.00	3.20	1.79	14.00	0.06
Number of sound teeth	22.03	22.82	24.00	22.60	4.76	28.00	0.16
Number of teeth affected by caries (DMF)	4.32	3.88	4.00	12.56	3.54	26.00	0.12
Number of decayed teeth	1.01	0.36	0.00	3.30	1.82	14.00	0.06
Number of successfully filled teeth	2.96	2.43	0.00	9.35	3.06	20.00	0.10
Number of teeth filled needing further care	0.23	0.10	0.00	0.32	0.57	5.00	0.02
Number of missing teeth	0.15	0.06	0.00	0.27	0.52	5.00	0.02
Number of teeth with gingivitis	6.50	5.28	0.00	32.97	5.74	26.00	0.19
Debris Index	0.68	0.66	0.50	0.21	0.46	3.00	0.02
Calculus Index	0.13	0.01	0.00	0.08	0.29	2.00	0.01
Oral Hygiene Index	0.81	0.64	0.50	0.38	0.29	3.67	0.02
Periodontal Index	0.26	0.21	0.00	0.06	0.25	1.85	0.01
Modified Periodontal Index	0.26	0.21	0.00	0.06	0.25	1.85	0.01
	0.81	0.67	0.50	0.38	0.62	3.67	0.02

¹ For students, only permanent teeth are considered in the analysis

TABLE 100

DISTRIBUTION BY NUMBER AND PERCENT OF SCORES ON
ORAL HYGIENE, DEBRIS, CALCULUS AND PERIODONTAL INDICES FOR
13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Index Score	Oral Hygiene		Debris Index		Calculus Index		Periodontal Index	
	N	%	N	%	N	%	N	%
0.00 - 0.05	67	7.2	70	7.5	682	72.9	192	20.5
0.05 - 0.25	73	7.8	87	9.3	82	8.8	368	39.3
0.25 - 0.45	121	12.9	129	13.8	68	7.3	204	21.8
0.45 - 0.65	142	15.2	163	17.4	22	2.4	95	10.1
0.65 - 0.85	203	21.7	228	24.4	52	5.6	48	5.1
0.85 - 1.05	92	9.8	105	11.2	12	1.3	19	2.0
1.05 - 1.25	60	6.4	53	5.7	5	0.5	6	0.6
1.25 - 1.45	41	4.4	36	3.8	2	0.2	2	0.2
1.45 - 1.65	38	4.1	25	2.7	3	0.3	1	0.1
1.65 - 1.85	44	4.7	23	2.5	7	0.7	1	0.1
1.85 - 2.05	11	1.2	10	1.1	1	0.1	0	0.0
2.05+	44	4.7	7	0.07	0	0.0	0	0.0
Total	936	100.0	936	100.0	936	100.0	936	100.0

TABLE 101

DISTRIBUTION BY NUMBER AND PERCENT OF
DENTOFACIAL ANOMALIES PRESENT FOR
13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

<u>Condition</u>	<u>N</u>	<u>% of Total Sample</u>
<u>Dentition</u>		
Congenital absence	38	4.1
Supernumerary	10	1.0
Malformed teeth	14	1.5
Impacted teeth	19	2.0
Transposed teeth	2	0.2
Missing teeth	178	19.0
Retained teeth	66	7.1
<u>Space</u>		
Crowding	263	28.1
Spacing	165	17.6
Anterior irregularities	283	30.2
Diastema	132	14.1
<u>Occlusion</u>		
Anteroposterior molar relation	334	35.7
Posterior openbite	49	5.2
Posterior crossbite	182	19.4
Overjet	141	15.1
Overbite	153	16.3
Midline deviation	201	21.5
Soft tissue impingement	31	3.3

TABLE 10 2

DISTRIBUTION BY NUMBER AND PERCENT OF
TREATMENT REQUIRED AND TREATMENT STATUS FOR
13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

<u>Treatment Required</u>	<u>N</u>	<u>%</u>
Not needed	623	66.6
Preventive care	75	8.0
Corrective	238	25.4
Total	936	100.0
<u>Treatment Status</u>	<u>N</u>	<u>%</u>
Not applicable	587	62.7
Completed	19	2.0
Being given	83	8.9
Not given	247	26.4
Total	936	100.0

TABLE 103

DETAILED STATISTICS OF TREATMENT NEED MEASURES FOR
13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name	Central Tendency			Dispersion		Standard Error
	Mean	Median	Mode	S ²	SD	
Number of teeth needing some treatment	1.30	0.54	0.00	4.14	2.03	0.07
Number of teeth needing restoration	1.23	0.52	0.00	3.67	1.92	0.06
Number of teeth needing extraction	0.07	0.02	0.00	0.12	0.34	0.01

TABLE 104

DISTRIBUTION BY NUMBER AND PERCENT OF
DECAYED, MISSING, FILLED AND DMF TEETH FOR
13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Number	Decayed		Missing		Filled		DMF	
	N	%	N	%	N	%	N	%
0	499	53.3	838	89.5	272	29.1	132	14.1
1	190	20.3	67	7.2	100	10.7	93	9.9
2	101	10.8	21	2.2	98	10.5	84	9.0
3	57	6.1	6	0.6	112	12.0	104	11.1
4	32	3.4	3	0.3	124	13.2	145	15.5
5	20	2.1	1	0.1	61	6.5	95	10.1
6+	37	4.0	0	0.0	169	18.0	283	30.2
Total	936	100.0	936	100.0	936	100.0	936	100.0

TABLE 105

DISTRIBUTION BY NUMBER AND PERCENT OF
TEETH NEEDING ANY TREATMENT, RESTORATION AND EXTRACTION FOR
13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Number	Any Treatment		Restoration		Extraction	
	N	%	N	%	N	%
0	459	49.0	465	49.7	892	95.3
1	200	21.4	202	21.6	25	2.7
2	116	12.4	117	12.5	16	1.7
3	59	6.3	59	6.3	3	0.3
4	35	3.7	35	3.7	0	0.0
5	25	2.7	23	2.5	0	0.0
6	14	1.5	13	1.4	0	0.0
7	9	1.0	8	0.9	0	0.0
8	5	0.5	2	0.2	0	0.0
9	3	0.3	1	0.1	0	0.0
10+	11	1.2	11	1.2	0	0.0
Total	936	100.0	936	100.0	936	100.0

TABLE 106

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
SEX AND LOCATION FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Teeth Present		Sound Teeth		Affected by Caries(DMF)		Decayed	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	936	26.87	1.79	22.03	4.75	4.32	3.54	1.01	1.82
Metropolitan	657	26.86	1.85	22.31	4.64	4.02	3.38	1.00	1.80
Metro males	306	26.80	1.97	22.18	4.74	3.83	3.14	0.94	1.62
Metro females	351	26.92	1.74	22.42	4.56	4.18	3.58	1.05	1.94
Non-metropolitan	297	26.89	1.65	21.38	4.95	5.02	3.81	1.06	1.86
Non-metro males	135	26.80	1.85	22.18	4.34	4.32	3.45	1.12	2.02
Non-metro females	144	26.98	1.44	20.62	5.37	5.68	4.02	1.00	1.71

TABLE 107

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
SEX AND LOCATION FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	Teeth Successfully Filled	Teeth Filled Needing Further Care	$\bar{X}$	SD	Lost to Carries	$\bar{X}$	SD
Total	936	2.96	3.06		0.23	0.57		0.15	0.52	
Metropolitan	657	2.69	2.84		0.22	0.56		0.15	0.54	
Metro males	306	2.59	2.79		0.22	0.54		0.14	0.54	
Metro females	351	2.77	2.88		0.22	0.58		0.16	0.54	
Non-metropolitan	279	3.60	3.44		0.24	0.58		0.17	0.48	
Non-metro males	135	2.87	2.97		0.27	0.62		0.12	0.41	
Non-metro females	144	4.29	3.71		0.22	0.55		0.21	0.54	

TABLE 108

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
SEX AND LOCATION FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Number of Teeth with Gingivitis		Debris Index		Calculus Index	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	936	6.50	5.74	0.68	0.46	0.13	0.29
Metropolitan	657	6.50	5.64	0.70	0.46	0.14	0.29
Metro males	306	7.46	5.89	0.80	0.50	0.16	0.30
Metro females	351	5.68	5.30	0.60	0.40	0.12	0.28
Non-metropolitan	279	6.49	5.97	0.64	0.46	0.11	0.28
Non-metro males	135	7.42	6.50	0.68	0.47	0.14	0.34
Non-metro females	144	5.62	5.31	0.61	0.45	0.08	0.21

TABLE 109
MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
SEX AND LOCATION FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Oral Hygiene Index			Periodontitis			Periodontal Index ¹		
	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD		
Total	936	0.81	0.62	0.01	0.09	0.26	0.25		
Metropolitan	657	0.84	0.61	0.01	0.10	0.26	0.25		
Metro males	306	0.96	0.65	0.01	0.08	0.30	0.26		
Metro females	351	0.73	0.56	0.01	0.12	0.23	0.23		
Non-metropolitan	279	0.75	0.62	0.00	0.00	0.26	0.25		
Non-metro males	135	0.82	0.68	0.00	0.00	0.30	0.28		
Non-metro females	144	0.69	0.56	0.00	0.00	0.22	0.21		

¹ The "Modified Periodontal Index" yielded exactly the same results.

TABLE 110
MEANS AND STANDARD DEVIATIONS FOR TEETH NEEDING ANY TREATMENT, RESTORATIONS OR EXTRACTIONS BY
SEX AND LOCATION FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Number of Teeth Needing:							
	Some Treatment			Restoration		Extraction	
	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	936	1.30	2.03	1.23	1.92	0.07	0.34
Metropolitan	657	1.28	2.03	1.22	1.92	0.06	0.32
Metro males	306	1.25	1.82	1.19	1.73	0.06	0.29
metro females	351	1.31	2.20	1.24	2.06	0.07	0.34
non-metropolitan	279	1.34	2.05	1.26	1.92	0.08	0.40
metro males	135	1.44	2.23	1.32	2.05	0.12	0.51
non-metro females	144	1.25	1.87	1.21	1.80	0.04	0.26

TABLE 111

MEANS AND STANDARD DEVIATIONS FOR TREATMENT TO NEED RATIOS BY
SEX AND LOCATION FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	All Treatment Received Over All Treatment Needed	Successful Treatment Over All Treatment Needed	$\bar{X}$	SD	Failed Treatment Over All Treatment Provided	$\bar{X}$	SD
Total	936	0.90	0.19		0.87	0.21	0.06	0.18		
Metropolitan	657	0.90	0.20		0.87	0.22	0.07	0.19		
Metro males	306	0.90	0.20		0.88	0.21	0.07	0.19		
Metro Females	351	0.89	0.20		0.87	0.22	0.06	0.18		
Non-metropolitan	279	0.90	0.17		0.88	0.19	0.06	0.16		
Non-metro males	135	0.90	0.19		0.87	0.21	0.07	0.18		
Non-metro females	144	0.91	0.16		0.88	0.18	0.04	0.12		

TABLE 112

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
SELECTED ORAL MORBIDITY MEASURES AS THE DEPENDENT VARIABLES AND LOCATION AND
SEX AS THE INDEPENDENT VARIABLES FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name Number of Teeth	Total Main Effects (Additive)	Separate Main Effects (Unique)		Total Two Way Interaction
		Location	Sex	
Present	0.492	0.812	0.242	0.816
Sound	0.014	0.006	0.327	0.008
Affected by caries (DMF)	0.000	0.000	0.005	0.043
Decayed	0.000	0.000	0.005	0.004
Successfully filled	0.784	0.550	0.727	0.582
Filled needing further care	0.844	0.630	0.737	0.385
Lost to caries	0.460	0.565	0.265	0.401
With gingivitis	0.000	0.916	0.000	0.985
With periodontitis	0.454	0.220	0.803	0.871

TABLE 113

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE FOR
SELECTED ORAL MORBIDITY MEASURES AS DEPENDENT VARIABLES AND
SEX AND LOCATION AS INDEPENDENT VARIABLES FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name Number of Teeth	Separate Main Effects (Unique)		
	Total Main Effects (Additive)	Location	Sex
Debris Index	0.000	0.078	0.000
Calculus Index	0.031	0.152	0.025
Oral Hygiene Index	0.000	0.046	0.000
Periodontal Index	0.000	0.808	0.000
Modified Periodontal Index	0.000	0.771	0.000
			0.035
			0.599
			0.186
			0.803
			0.797

TABLE 114

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
MEASURES OF TREATMENT NEEDED AS THE DEPENDENT VARIABLES AND
LOCATION AND SEX AS THE INDEPENDENT VARIABLES FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name	Total Main Effects (Additive)	Separate Main Effects (Unique)		Total 2 Way Interaction
		Location	Sex	
Number of teeth needing some treatment	0.912	0.676	0.925	0.373
Number of teeth needing restorations	0.948	0.748	0.948	0.538
Number of teeth needing extraction	0.517	0.500	0.358	0.067

TABLE 115

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF TEETH PRESENT
BY SEX AND LOCATION FOR 13-14 YEAR OLDS, FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 26.87$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	275	26.83	1.98	194	27.19	1.41	91	26.49	2.02	97	26.67	1.97
Metro males	122	26.70	2.29	94	27.27	1.40	46	25.91	2.26	44	27.02	1.32
Metro females	153	26.93	1.70	100	27.11	1.42	45	27.09	1.56	53	26.38	2.35
Non-metropolitan	17	26.18	2.24	141	27.07	1.40	97	26.75	1.74	24	26.92	1.20
Non-metro males	6	26.17	2.86	68	27.03	1.37	49	26.59	2.06	12	26.67	2.67
Non-metro females	11	26.18	1.99	73	27.11	1.44	48	26.92	1.35	12	27.17	1.03

TABLE 116

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF SOUND TEETH
BY SEX AND LOCATION FOR 13-14 YEAR OLDS, FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 22.03$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	275	22.43	4.69	194	23.18	4.33	91	22.27	3.92	97	20.27	5.16
Metro males	122	22.24	4.99	94	23.01	4.23	46	21.59	4.81	44	20.89	4.82
Metro females	153	22.58	4.46	100	23.34	4.43	45	22.98	2.62	53	19.75	5.41
Non metropolitan	17	18.71	7.60	141	21.10	5.12	97	21.60	4.13	24	24.00	3.51
Non metro males	6	24.33	4.37	68	21.87	4.43	49	22.04	4.28	12	23.50	4.03
Non metro females	11	15.64	7.31	73	20.38	5.62	48	21.15	3.97	12	24.50	3.00

TABLE 117

MEANS AND STANDARD DEVIATIONS FOR TOTAL CARIES EXPERIENCE (DMF)
BY SEX AND LOCATION FOR 13-14 YEAR OLDS, FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 4.32$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	275	3.34	2.68	194	3.83	3.34	91	3.86	2.89	97	6.45	4.48
Metro males	122	2.98	2.47	94	4.07	3.09	46	3.83	3.37	44	5.68	3.80
Metro females	153	3.63	2.81	100	3.60	3.56	45	3.89	2.34	53	7.09	4.92
Non-metropolitan	17	5.06	4.94	141	5.12	3.56	97	5.32	4.03	24	3.21	3.11
Non-metro males	6	1.83	2.14	68	4.47	3.00	49	4.63	4.06	12	3.42	3.34
Non-metro females	11	6.82	5.21	73	5.73	3.93	48	6.02	3.90	12	3.00	2.98

TABLE 118

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF DECAYED TEETH
 BY SEX AND LOCATION FOR 13-14 YEAR OLDS, FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 1.01$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	275	0.70	1.31	194	0.74	1.53	91	1.52	1.90	97	1.86	2.78
Metro males	122	0.61	1.24	94	0.83	1.28	46	1.56	1.90	44	1.41	2.43
Metro females	153	0.76	1.36	100	0.66	1.74	45	1.47	1.92	53	2.23	3.00
Non-metropolitan	17	0.76	0.90	141	0.74	1.24	97	1.62	2.59	24	0.88	1.39
Non-metro males	6	0.17	0.41	68	0.85	1.42	49	1.67	2.75	12	0.83	1.47
Non-metro females	11	1.09	0.94	73	0.63	1.05	48	1.56	2.45	12	0.92	1.38

TABLE 119

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF TEETH LOST TO CARIES
BY SEX AND LOCATION FOR 13-14 YEAR OLDS, FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 0.15$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	275	0.07	0.36	194	0.17	0.57	91	0.12	0.42	97	0.35	0.85
Metro males	122	0.06	0.41	94	0.22	0.72	46	0.15	0.47	44	0.16	0.43
Metro females	153	0.08	0.31	100	0.12	0.38	45	0.09	0.36	53	0.51	1.07
Non-metropolitan	17	0.06	0.24	141	0.13	0.43	97	0.22	0.52	24	0.29	0.69
Non-metro males	6	0.00	0.00	68	0.10	0.43	49	0.14	0.41	12	0.25	0.45
Non-metro females	11	0.09	0.30	73	0.15	0.43	48	0.29	0.62	12	0.33	0.89

TABLE 120

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF TEETH SUCCESSFULLY FILLED
BY SEX AND LOCATION FOR 13-14 YEAR OLDS, FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 2.96$)

	Toronto				Oshawa				Cornwall				Thunder Bay			
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	
Metropolitan	275	2.38	2.35	194	2.72	2.93	91	2.14	2.74	97	3.99	3.56				
Metro males	122	2.21	2.21	94	2.76	2.72	46	2.11	3.28	44	3.82	3.44				
Metro females	153	2.52	2.46	100	2.69	3.13	45	2.18	2.08	53	4.13	3.67				
Non-metropolitan	17	3.88	4.43	141	4.09	3.39	97	3.23	3.32	24	2.04	2.97				
Non-metro males	6	1.17	1.17	68	3.25	2.89	49	2.67	3.07	12	2.33	3.45				
Non-metro females	11	5.36	4.88	73	4.88	3.65	48	3.79	3.50	12	1.75	2.53				

TABLE 121

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF TEETH FILLED AND NEEDING FURTHER CARE
BY SEX AND LOCATION FOR 13-14 YEAR OLDS, FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 0.23$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	275	0.22	0.56	194	0.21	0.56	91	0.16	0.54	97	0.27	0.59
Metro males	122	0.16	0.41	94	0.29	0.65	46	0.13	0.50	44	0.32	0.60
Metro females	153	0.27	0.65	100	0.14	0.45	45	0.20	0.59	53	0.23	0.58
Non-metropolitan	17	0.35	0.86	141	0.23	0.56	97	0.30	0.63	24	0.00	0.00
Non-metro males	6	0.50	1.22	68	0.34	0.66	49	0.20	0.54	12	0.00	0.00
Non-metro females	11	0.27	0.65	73	0.14	0.42	48	0.40	0.71	12	0.00	0.00

TABLE 122

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF TEETH WITH GINGIVITIS
BY SEX AND LOCATION FOR 13-14 YEAR OLDS, FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 6.50$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	275	6.76	5.60	194	5.92	5.59	91	7.06	5.38	97	6.43	6.10
Metro males	122	7.66	5.66	94	7.35	5.96	46	7.37	5.21	44	7.23	7.09
Metro females	153	6.04	5.46	100	4.58	4.89	45	6.76	5.59	53	5.77	5.11
Non-metropolitan	17	9.24	6.48	141	5.22	5.52	97	7.65	6.49	24	7.38	4.32
Non-metro males	6	11.83	8.82	68	6.60	6.81	49	7.73	6.05	12	8.58	4.44
Non-metro females	11	7.82	4.69	73	3.93	3.55	48	7.56	6.98	12	6.17	4.02

TABLE 123

MEANS AND STANDARD DEVIATIONS FOR PERIODONTAL INDEX

BY SEX AND LOCATION FOR 13-14 YEAR OLDS, FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 0.26$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	275	0.27	0.23	194	0.24	0.26	91	0.29	0.24	97	0.26	0.28
Metro males	122	0.30	0.22	94	0.30	0.29	46	0.31	0.24	44	0.30	0.34
Metro females	153	0.24	0.24	100	0.18	0.22	45	0.26	0.23	53	0.24	0.22
Non-metropolitan	17	0.35	0.23	141	0.21	0.23	97	0.31	0.27	24	0.29	0.19
Non-metro males	6	0.45	0.30	68	0.27	0.29	49	0.33	0.27	12	0.34	0.21
Non-metro females	11	0.30	0.18	73	0.16	0.15	48	0.29	0.28	12	0.23	0.15

TABLE 124

MEANS AND STANDARD DEVIATIONS FOR ORAL HYGIENE INDEX
BY SEX AND LOCATION FOR 13-14 YEAR OLDS, FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 0.40$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	275	0.82	0.53	194	0.74	0.57	91	1.14	0.76	97	0.79	0.68
Metro males	122	0.90	0.55	94	0.88	0.63	46	1.28	0.81	44	1.01	0.70
Metro females	153	0.76	0.51	100	0.60	0.47	45	1.01	0.70	53	0.61	0.60
Non-metropolitan	17	1.14	0.78	141	0.50	0.44	97	1.05	0.69	24	0.79	0.49
Non-Metro males	6	1.36	1.14	68	0.56	0.55	49	1.07	0.69	12	0.97	0.53
Non-metro females	11	1.02	0.52	73	0.44	0.31	48	1.02	0.70	12	0.61	0.39

TABLE 125

MEANS AND STANDARD DEVIATIONS FOR RATIO OF ALL TREATMENT
RECEIVED OVER ALL TREATMENT EVER NEEDED BY SEX, LOCATION AND STUDY AREAS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 0.90$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	275	0.89	0.20	194	0.92	0.17	91	0.92	0.18	97	0.83	0.25
Metro male	122	0.90	0.20	94	0.89	0.21	46	0.93	0.18	44	0.88	0.21
Metro female	153	0.88	0.20	100	0.95	0.12	45	0.90	0.19	53	0.80	0.28
Non-metropolitan	17	0.90	0.16	141	0.91	0.17	97	0.89	0.19	24	0.92	0.20
Non-metro male	6	1.00	0.00	68	0.90	0.19	49	0.88	0.19	12	0.92	0.21
Non-metro female	11	0.85	0.18	73	0.93	0.14	48	0.90	0.18	12	0.92	0.19

TABLE 126

MEANS AND STANDARD DEVIATIONS FOR RATIO OF
SUCCESSFUL TREATMENT OVER ALL TREATMENT EVER NEEDED BY SEX, LOCATION AND STUDY AREAS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 0.88$)

	Toronto			Oshawa			Cornwall			Thunder Bay		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Metropolitan	275	0.87	0.22	194	0.90	0.20	91	0.89	0.20	97	0.83	0.25
Metro male	122	0.88	0.21	94	0.88	0.23	46	0.91	0.19	44	0.86	0.19
Metro female	153	0.86	0.22	100	0.93	0.16	45	0.84	0.22	53	0.80	0.28
Non-metropolitan	17	0.86	0.19	141	0.88	0.18	97	0.86	0.21	24	0.92	0.20
Non-metro male	6	0.92	0.20	68	0.86	0.21	49	0.87	0.20	12	0.92	0.21
Non-metro female	11	0.83	0.19	73	0.91	0.15	48	0.85	0.21	12	0.92	0.19

TABLE 127

RATIO OF NEED FOR RETREATMENT TO TOTAL TREATMENT PROVIDED
BY SEX AND LOCATION FOR 13-14 YEAR OLDS FOR STUDY AREAS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 0.06$)

	Toronto		Oshawa		Cornwall		Thunder Bay	
	N	Ratio	N	Ratio	N	Ratio	N	Ratio
Metropolitan	275	0.08	194	0.06	91	0.03	97	0.08
Metro male	122	0.06	94	0.09	46	0.02	44	0.10
Metro female	153	0.10	100	0.03	45	0.04	53	0.05
Non-metropolitan	17	0.05	141	0.06	97	0.07	24	0.00
Non-metro male	6	0.08	68	0.09	49	0.05	12	0.00
Non-metro female	11	0.03	73	0.02	48	0.09	12	0.00

TABLE 128

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF TEETH PRESENT
BY SEX, LOCATION AND FLUORIDE STATUS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	424	26.83	1.94	62	26.85	1.60	60	27.20	1.25	298	26.83	1.75	90	27.01	1.61
Metropolitan	339	26.80	1.98	21	27.14	1.93	44	27.11	1.32	194	26.86	1.74	58	26.96	1.72
Metro Male	167	26.57	2.25	8	27.38	1.41	20	27.45	1.39	86	26.88	1.66	24	27.29	1.16
Metro Female	172	27.02	1.67	13	27.00	2.24	24	26.83	1.20	108	26.83	1.81	34	26.74	2.00
Non-Metropolitan	85	26.93	1.76	41	26.71	1.40	16	27.44	1.03	104	26.78	1.78	32	27.09	1.42
Non-Metro Male	48	26.79	1.92	19	26.68	1.38	5	27.20	0.45	50	26.62	2.16	13	27.54	0.88
Non-Metro Female	37	27.11	1.52	22	26.73	1.45	11	27.54	1.21	54	26.92	1.34	19	26.79	1.65
Entire Sample	934*	26.87	1.79												

* Two cases missing

TABLE 129

MEANS AND STANDARD DEVIATIONS FOR
NUMBER OF SOUND TEETH BY SEX, LOCATION AND FLUORIDE STATUS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	424	22.30	4.76	62	21.26	5.23	60	23.00	4.44	298	21.70	4.52	90	21.69	5.25
Metropolitan	339	22.51	4.58	21	22.71	3.72	44	23.61	4.52	194	21.66	4.70	58	22.17	5.07
Metro Male	167	22.15	4.69	8	21.75	4.37	20	25.00	2.90	86	21.27	5.04	24	23.54	4.63
Metro Female	172	22.86	4.46	13	23.31	3.30	24	22.46	5.31	108	21.98	4.41	34	21.20	5.21
Non-Metropolitan	85	21.45	5.37	41	20.51	5.75	16	21.31	3.88	104	21.78	4.18	32	20.81	5.52
Non-Metro Male	48	22.21	4.59	19	23.32	3.79	5	22.00	3.08	50	21.68	4.60	13	22.46	3.64
Non-Metro Female	37	20.46	6.16	22	18.09	6.12	11	21.00	4.29	54	21.87	3.78	19	19.68	6.35
Entire Sample	934*	22.03	4.75												

* Two cases missing

TABLE 130

MEANS AND STANDARD DEVIATIONS FOR
CARIES EXPERIENCE (DMF) BY SEX, LOCATION AND FLUORIDE STATUS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	Teeth SD	N	$\bar{X}$	Teeth SD	N	$\bar{X}$	Teeth SD	N	$\bar{X}$	Teeth SD	N	$\bar{X}$	Teeth SD
Total	424	3.72	3.22	62	4.84	3.50	60	3.98	2.92	298	4.94	3.70	90	4.94	4.37
Metropolitan	339	3.47	2.89	21	3.90	2.55	44	3.20	2.46	194	4.98	3.78	58	4.55	4.60
Metro Male	167	3.44	2.69	8	3.88	2.64	20	2.70	2.74	86	5.07	3.73	24	2.88	2.07
Metro Female	172	3.50	3.08	13	3.92	2.60	24	3.62	2.16	108	4.92	3.84	34	5.74	5.15
Non-Metropolitan	85	4.69	4.18	41	5.32	3.84	16	6.12	3.12	104	4.86	3.54	32	5.66	3.87
Non-Metro Male	48	3.96	3.57	19	3.53	3.32	5	5.00	1.87	50	4.68	3.47	13	5.15	3.60
Non-Metro Female	37	5.64	4.74	22	6.86	3.63	11	6.64	3.50	54	5.02	3.62	19	6.00	4.11
Entire Sample	934*	4.32	3.54												

* Two cases missing

TABLE 131

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
DECAYED TEETH BY SEX, LOCATION AND FLUORIDE STATUS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	424	0.80	1.41	62	1.14	2.27	60	0.92	1.38	298	1.19	2.15	90	1.42	2.10
Metropolitan	339	0.75	1.28	21	1.05	1.94	44	0.86	1.17	194	1.30	2.39	58	1.52	2.15
Metro Male	167	0.84	1.43	8	1.12	1.36	20	1.00	1.30	86	1.12	2.08	24	0.92	1.28
Metro Female	172	0.66	1.12	13	1.00	2.27	24	0.75	1.07	108	1.45	2.61	34	1.94	2.53
Non-Metropolitan	85	1.01	1.82	41	1.20	2.44	16	1.06	1.88	104	0.99	1.60	32	1.25	2.03
Non-Metro Male	48	1.10	2.24	19	1.00	2.21	5	2.20	2.68	50	1.02	1.80	13	1.31	1.55
Non-Metro Female	37	0.89	1.05	22	1.36	2.66	11	0.54	1.21	54	0.96	1.41	19	1.21	2.35
Entire Sample	934*	1.01	1.82												

* Two cases missing

TABLE 132

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
TEETH LOST TO CARIES BY SEX, LOCATION AND FLUORIDE STATUS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	424	0.09	0.38	62	0.16	0.45	60	0.23	0.77	298	0.22	0.60	90	0.16	0.63
Metropolitan	339	0.08	0.35	21	0.14	0.48	44	0.27	0.87	194	0.22	0.62	58	0.19	0.76
Metro Male	167	0.09	0.39	8	0.00	0.00	20	0.40	1.19	86	0.22	0.62	24	0.00	0.00
Metro Female	172	0.08	0.31	13	0.23	0.60	24	0.17	0.48	108	0.21	0.63	34	0.32	0.98
Non-Metropolitan	85	0.13	0.48	41	0.17	0.44	16	0.13	0.34	104	0.23	0.56	32	0.09	0.30
Non-Metro Male	48	0.08	0.40	19	0.16	0.50	5	0.20	0.45	50	0.14	0.40	13	0.15	0.38
Non-Metro Female	37	0.19	0.57	22	0.18	0.39	11	0.09	0.30	54	0.31	0.67	9	0.05	0.23
Entire Sample	934*	0.15	0.52												

* Two cases missing

TABLE 133

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
SUCCESSFULLY FILLED TEETH BY SEX, LOCATION AND FLUORIDE STATUS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	424	2.67	2.92	62	3.24	3.01	60	2.78	2.47	298	3.31	3.24	90	3.08	3.35
Metropolitan	339	2.47	2.65	21	2.76	2.47	44	2.02	1.78	194	3.25	3.26	58	2.50	2.89
Metro Male	167	2.35	2.39	8	3.00	2.88	20	1.30	1.42	86	3.48	3.39	24	1.92	2.95
Metro Female	172	2.59	2.88	13	2.62	2.29	24	2.62	1.86	108	3.06	3.16	34	2.91	2.82
Non-Metropolitan	85	3.48	3.71	41	3.49	3.25	16	4.88	2.92	104	3.42	3.22	32	4.12	3.89
Non-Metro Male	48	2.69	2.59	.9	2.05	2.61	5	2.80	1.30	50	3.22	3.45	13	3.38	3.25
Non-Metro Female	37	4.51	4.62	22	4.73	3.28	11	5.82	2.99	54	3.61	3.00	19	4.63	4.28
Entire Sample	934*	2.96	3.06												

* Two cases missing

TABLE 134

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
TEETH FILLED NEEDING FURTHER CARE BY SEX, LOCATION AND FLUORIDE STATUS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	424	0.19	0.50	62	0.32	0.72	60	0.17	0.42	298	0.24	0.56	90	0.32	0.80
Metropolitan	339	0.21	0.53	21	0.05	0.22	44	0.16	0.43	194	0.24	0.54	58	0.34	0.87
Metro Male	167	0.23	0.57	8	0.00	0.00	20	0.15	0.49	86	0.28	0.57	24	0.04	0.20
Metro Female	172	0.18	0.49	13	0.17	0.38	24	0.17	0.38	108	0.20	0.52	34	0.56	1.08
Non-Metropolitan	85	0.13	0.37	41	0.46	0.84	16	0.19	0.40	104	0.25	0.59	32	0.28	0.68
Non-Metro Male	48	0.19	0.44	19	0.32	0.82	5	0.20	0.45	50	0.30	0.68	13	0.38	0.77
Non-Metro Female	37	0.05	0.23	22	0.59	0.85	11	0.18	0.40	54	0.20	0.49	19	0.21	0.63
Entire Sample	934*	0.23	0.57												

* Two cases missing

TABLE 135

MEANS AND STANDARD DEVIATIONS FOR
DEBRIS INDEX BY SEX, LOCATION AND FLUORIDE STATUS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	Teeth SD	N	$\bar{X}$	Teeth SD	N	$\bar{X}$	Teeth SD	N	$\bar{X}$	Teeth SD	N	$\bar{X}$	Teeth SD
Total	424	0.68	0.49	62	0.75	0.48	60	0.66	0.31	298	0.65	0.43	90	0.75	0.48
Metropolitan	339	0.70	0.49	21	0.68	0.43	44	0.66	0.33	194	0.68	0.45	58	0.78	0.46
Metro Male	167	0.79	0.54	8	0.83	0.28	20	0.83	0.34	86	0.79	0.48	24	0.92	0.46
Metro Female	172	0.61	0.41	13	0.59	0.48	24	0.52	0.26	108	0.59	0.40	34	0.68	0.44
Non-Metropolitan	85	0.60	0.51	41	0.79	0.50	16	0.64	0.26	104	0.60	0.40	32	0.70	0.50
Non-Metro Male	48	0.64	0.51	19	0.89	0.54	5	0.68	0.26	50	0.63	0.42	13	0.65	0.43
Non-Metro Female	37	0.56	0.52	22	0.70	0.46	11	0.62	0.27	54	0.57	0.38	19	0.73	0.56
Entire Sample	934*	0.68	0.46												

* Two cases missing

TABLE 136

MEANS AND STANDARD DEVIATIONS FOR
CALCULUS INDEX BY SEX, LOCATION AND FLUORIDE STATUS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE 1977

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	424	0.12	0.28	62	0.17	0.30	60	0.12	0.28	298	0.14	0.30	90	0.15	0.30
Metropolitan	339	0.10	0.24	21	0.25	0.38	44	0.16	0.32	194	0.18	0.34	58	0.17	0.34
Metro Male	167	0.14	0.28	8	0.23	0.46	20	0.19	0.38	86	0.15	0.29	24	0.23	0.41
Metro Female	172	0.06	0.18	13	0.27	0.33	24	0.12	0.26	108	0.20	0.38	34	0.13	0.29
Non-Metropolitan	85	0.16	0.41	41	0.12	0.25	16	0.03	0.09	104	0.08	0.21	32	0.10	0.18
Non-Metro Male	48	0.19	0.46	19	0.13	0.27	5	0.03	0.07	50	0.11	0.26	13	0.12	0.21
Non-Metro Female	37	0.11	0.32	22	0.11	0.23	11	0.03	0.10	54	0.06	0.14	19	0.10	0.17
Entire Sample	934*	0.13	0.29												

* Two cases missing

TABLE 137

MEANS AND STANDARD DEVIATIONS FOR
ORAL HYGIENE INDEX (SIMPLIFIED) BY SEX, LOCATION AND FLUORIDE STATUS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

(Total Sample $\bar{X} = 0.81$)

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	Teeth SD	N	$\bar{X}$	Teeth SD	N	$\bar{X}$	Teeth SD	N	$\bar{X}$	Teeth SD	N	$\bar{X}$	Teeth SD
Total	424	0.79	0.64	62	0.92	0.62	60	0.78	0.43	298	0.80	0.61	90	0.90	0.90
Metropolitan	339	0.80	0.60	21	0.94	0.66	44	0.82	0.47	194	0.86	0.65	58	0.95	0.95
Metro Male	167	0.94	0.66	8	1.06	0.64	20	1.03	0.53	86	0.95	0.66	24	1.16	1.16
Metro Female	172	0.67	0.50	13	0.86	0.69	24	0.65	0.35	108	0.78	0.78	34	0.87	0.81
Non-Metropolitan	85	0.76	0.79	41	0.91	0.60	16	0.67	0.29	104	0.69	0.69	32	0.80	0.80
Non-Metro Male	48	0.83	0.85	19	1.03	0.61	5	0.71	0.32	50	0.75	0.75	13	0.77	0.77
Non-Metro Female	37	0.67	0.72	22	0.81	0.60	11	0.65	0.29	54	0.63	0.63	19	0.82	0.82
Entire Sample	934*	0.81	0.62												

* Two cases missing

TABLE 138

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF
TEETH WITH GINGIVITIS BY SEX, LOCATION AND FLUORIDE STATUS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	424	6.50	5.98	62	7.53	5.32	60	7.77	5.36	298	5.97	5.62	90	6.86	5.41
Metropolitan	339	6.36	5.74	21	7.05	5.57	44	7.77	5.09	194	6.35	5.66	58	6.72	5.58
Metro Male	167	7.64	5.98	8	8.25	6.54	20	9.65	5.28	86	6.84	5.97	24	6.46	5.16
Metro Female	172	5.13	5.22	13	6.31	5.02	24	6.21	4.45	108	5.96	5.39	34	6.91	5.93
Non-Metropolitan	85	7.01	6.86	41	7.78	5.24	16	7.75	6.20	104	5.25	5.51	32	7.09	5.17
Non-Metro Male	48	7.92	7.47	19	9.00	5.07	5	14.20	6.72	50	5.52	5.76	13	8.00	4.92
Non-Metro Female	37	5.84	5.88	22	6.73	5.27	11	4.82	3.06	54	5.00	5.31	19	6.47	5.38
Entire Sample	934*	6.50	5.74												

* Two cases missing

TABLE 139

MEANS AND STANDARD DEVIATIONS FOR
PERIODONTAL SCORE BY SEX, LOCATION AND FLUORIDE STATUS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	424	0.26	0.25	62	0.30	0.24	60	0.29	0.21	298	0.24	0.26	90	0.28	0.24
Metropolitan	339	0.25	0.24	21	0.28	0.26	44	0.30	0.20	194	0.26	0.28	58	0.28	0.24
Metro Male	167	0.31	0.25	8	0.36	0.36	20	0.36	0.20	86	0.29	0.30	24	0.27	0.22
Metro Female	172	0.20	0.22	13	0.23	0.18	24	0.24	0.19	108	0.25	0.26	34	0.28	0.25
Non-Metropolitan	85	0.29	0.29	41	0.31	0.23	16	0.29	0.23	104	0.20	0.21	32	0.29	0.26
Non-Metro Male	48	0.33	0.32	19	0.37	0.25	5	0.54	0.24	50	0.22	0.23	13	0.32	0.26
Non-Metro Female	37	0.23	0.23	22	0.25	0.20	11	0.18	0.11	54	0.19	0.20	19	0.28	0.27
Entire Sample	934*	0.26	0.25												

* Two cases missing

TABLE 140

MEANS AND STANDARD DEVIATIONS FOR MODIFIED PERIODONTAL SCORE

BY SEX, LOCATION AND FLUORIDE STATUS

FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	424	0.26	0.25	62	0.30	0.24	60	0.30	0.21	298	0.24	0.26	90	0.28	0.25
Metropolitan	339	0.25	0.24	21	0.28	0.26	44	0.30	0.20	194	0.27	0.28	58	0.28	0.24
Metro Male	167	0.31	0.25	8	0.36	0.36	20	0.37	0.20	86	0.29	0.30	24	0.27	0.22
Metro Female	172	0.20	0.22	13	0.23	0.18	24	0.24	0.19	108	0.25	0.27	34	0.28	0.25
Non-Metropolitan	85	0.29	0.29	41	0.31	0.23	16	0.29	0.23	104	0.20	0.21	32	0.29	0.27
Non-Metro Male	48	0.33	0.32	19	0.37	0.25	5	0.54	0.24	50	0.22	0.23	13	0.32	0.26
Non-Metro Female	37	0.23	0.23	22	0.25	0.20	11	0.18	0.11	54	0.19	0.20	19	0.28	0.27
Entire Sample	934*	0.26	0.25												

* Two cases missing

TABLE 141

MEANS AND STANDARD DEVIATIONS FOR RATIO OF ALL TREATMENT
RECEIVED OVER ALL TREATMENT EVER NEEDED BY SEX, LOCATION AND FLUORIDE STATUS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	424	0.91	0.17	62	0.91	0.20	60	0.86	0.23	298	0.89	0.20	90	0.88	0.20
Metropolitan	339	0.92	0.18	21	0.92	0.20	44	0.86	0.22	194	0.88	0.22	58	0.86	0.22
Metro Male	167	0.90	0.19	8	0.92	0.13	20	0.82	0.26	86	0.89	0.21	24	0.96	0.11
Metro Female	172	0.93	0.16	13	0.92	0.24	24	0.89	0.18	108	0.87	0.23	34	0.79	0.24
Non-Metropolitan	85	0.91	0.16	41	0.91	0.20	16	0.85	0.25	104	0.91	0.17	32	0.91	0.17
Non-Metro Male	48	0.90	0.16	19	0.98	0.06	5	0.68	0.36	50	0.90	0.20	13	0.87	0.23
Non-Metro Female	37	0.91	0.15	22	0.84	0.25	11	0.93	0.14	54	0.92	0.13	19	0.94	0.11
Entire Sample	934*	0.90	0.19												

* Two cases missing

TABLE 142

MEANS AND STANDARD DEVIATIONS FOR RATIO OF
SUCCESSFUL TREATMENT OVER ALL TREATMENT EVER NEEDED
BY SEX, LOCATION AND FLUORIDE STATUS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Born and Raised in Fluoride Area			Born in Fluoride Area			Raised in Fluoride Area			Born and Raised in Non-Fluoride Area			No Information		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Total	424	0.89	0.20	62	0.88	0.23	60	0.82	0.25	298	0.87	0.21	90	0.84	0.24
Metropolitan	339	0.89	0.20	21	0.91	0.21	44	0.82	0.25	194	0.86	0.22	58	0.82	0.26
Metro Male	167	0.88	0.21	8	0.92	0.13	20	0.79	0.29	86	0.87	0.21	24	0.95	0.12
Metro Female	172	0.91	0.19	13	0.90	0.26	24	0.85	0.22	108	0.86	0.23	34	0.73	0.29
Non-Metropolitan	85	0.88	0.18	41	0.86	0.23	16	0.83	0.26	104	0.89	0.17	32	0.87	0.20
Non-Metro Male	48	0.87	0.20	19	0.93	0.16	5	0.66	0.38	50	0.89	0.19	13	0.82	0.24
Non-Metro Female	37	0.91	0.16	22	0.80	0.27	11	0.91	0.15	54	0.89	0.16	19	0.90	0.16
Entire Sample	934*	0.88	0.21												

* Two cases missing

CHAPTER FOUR

INTER-COUNTRY COMPARISON OF STUDENTS

The Ontario study is a replication of the International Collaborative Study. It is possible, therefore, to compare the students oral health status across cultures. Tables 143 to 145 present some of the oral morbidity measures.

The mean number of DMF teeth of 13-14 year old Ontario students (4.32) was the lowest next to those of the Baltimore, United States students (2.93) (Table 143). Ontario, whose students have a mean number of 1.01 decayed teeth was higher than New Zealand (0.41), Norway (0.60) and the United States (0.84). It should be noted that New Zealand and Norway had special dental programs for this age group which must certainly have been a factor in their low level of unmet need.

The students in Japan (0.07), New Zealand (0.05) and Baltimore, United States (p.10) all had lower numbers of missing teeth than Ontario students (0.15).

Ontario students had the second lowest number of successfully filled teeth (2.96) after Baltimore, United States students. The same pattern is followed for filled teeth requiring further treatment with Baltimore, United States students having 0.05 and Ontario 0.23.

With regard to oral hygiene indicators, (Table 144) Ontario students had the lowest number of teeth with gingivitis and the lowest periodontal index. The Oral Hygiene Index scores were almost identical to those of New Zealand and the United States.

Ontario has the third highest ratio of successful treatment to need (0.87) next to New Zealand (0.93) and Norway (0.90), the two countries

with childrens' dental programs (Table 145). In terms of failed treatment, Ontario (0.06) was comparatively lower than Australia, Germany and Japan but higher than the United States (0.02), New Zealand (0.03) and Norway (0.05).

Table 146 examines the treatment/need measures from a different perspective. In terms of unmet need as a proportion of DMF, Canada is the lowest next to the two countries with school dental health programmes. The same pattern is followed with successfully filled teeth with Canada having the highest proportion after New Zealand and Norway.

Summary

The caries experience of Ontario students was better than the other ICS countries and second only to the Baltimore, U.S.A. students. It is particularly worth noting how much better the Ontario group is on the oral hygiene indicators. As will be discussed in the chapter on sociological factors, this may be related to the fact that Ontario students have good toothbrushing habits.

TABLE 143

MEANS FOR SELECTED ORAL MORBIDITY MEASURES BY
SEX AND LOCATION FOR 13-14 YEAR OLDS BY STUDY AREA

	<u>Study Areas</u>						
	Aust.	F.R.G.	Jap.	N.Z.	Nor.	U.S.A.	Canada (Ontario)
<u>Total Caries Experience (DMF)</u>							
Total	6.67	8.80	7.51	10.74	12.62	2.93	4.32
Metro Males	5.82	7.82	6.80	10.06	12.24	2.50	3.83
Non-Metro Males	7.05	8.45	7.05	10.57	12.52	2.79	4.32
Metro Females	6.22	9.10	8.22	10.49	13.00	2.89	4.18
Non-Metro Females	7.35	9.88	8.11	11.91	12.74	3.72	5.68
<u>Number of Decayed Teeth</u>							
Total	2.27	3.16	3.48	0.41	0.60	0.84	1.01
Metro Males	1.94	2.90	2.92	0.60	0.70	0.76	0.94
Non-Metro Males	2.80	3.65	3.93	0.41	0.72	0.87	1.12
Metro Females	1.97	2.60	2.92	0.36	0.55	0.81	1.05
Non-Metro Females	2.32	3.47	3.93	0.28	0.42	0.96	1.00
<u>Number of Missing Teeth</u>							
Total	0.51	0.39	0.07	0.05	0.41	0.10	0.15
Metro Males	0.38	0.27	0.05	0.15	0.29	0.11	0.14
Non-Metro Males	0.59	0.48	0.11	0.01	0.46	0.05	0.12
Metro Females	0.51	0.41	0.04	0.04	0.39	0.17	0.16
Non-Metro Females	0.52	0.43	0.05	0.01	0.50	0.07	0.21
<u>Number of Successfully Filled Teeth</u>							
Total	3.61	3.92	3.07	9.96	11.00	2.00	2.96
Metro Males	3.17	3.44	3.14	9.06	10.67	1.67	2.59
Non-Metro Males	3.38	2.96	2.20	9.84	10.62	1.92	2.87
Metro Females	3.49	4.74	4.35	9.76	11.55	1.90	2.77
Non-Metro Females	4.23	4.61	2.97	11.26	11.22	2.66	4.29
<u>Number of Filled Teeth Needing Further Care</u>							
Total	0.31	1.36	0.90	0.34	0.63	0.05	0.23
Metro Males	0.38	1.28	0.70	0.28	0.61	0.03	0.22
Non-Metro Males	0.33	1.39	0.92	0.35	0.76	0.04	0.27
Metro Females	0.26	1.37	0.91	0.34	0.52	0.07	0.22
Non-Metro Females	0.30	1.39	1.16	0.38	0.63	0.07	0.22

TABLE 144

MEANS FOR SELECTED ORAL MORBIDITY MEASURES BY
SEX AND LOCATION FOR 13-14 YEAR OLDS BY STUDY AREA

	<u>Study Areas</u>						
	Aust.	F.R.G.	Jap.	N.Z.	Nor.	U.S.A.	Canada (Ontario)
<u>Number of Teeth with Gingivitis</u>							
Total	17.07	18.23	14.05	13.97	13.83	12.55	6.50
Metro Males	17.11	18.62	10.54	14.13	15.36	13.54	7.46
Non- Metro Males	18.22	19.28	16.82	15.24	15.18	13.50	7.42
Metro Females	16.19	16.52	10.08	12.63	12.79	11.79	5.68
Non-Metro Females	16.71	18.36	17.32	13.94	11.83	11.22	5.62
<u>Periodontal Index (PI)</u>							
Total	0.79	0.80	0.55	0.57	0.53	0.54	0.26
Metro Males	0.79	0.81	0.30	0.58	0.64	0.58	0.30
Non-Metro Males	0.89	0.86	0.76	0.69	0.63	0.58	0.30
Metro Females	0.73	0.72	0.28	0.44	0.44	0.51	0.23
Non-Metro Females	0.75	0.83	0.76	0.58	0.39	0.47	0.22
<u>Oral Hygiene Index (OHI-S)</u>							
Total	1.18	1.26	1.56	0.79	1.04	0.78	0.81
Metro Males	1.27	1.31	1.60	0.94	1.12	0.90	0.96
Non-Metro Males	1.27	1.30	1.50	0.76	1.18	0.82	0.82
Metro Females	1.10	1.18	1.51	0.78	0.89	0.76	0.73
Non-Metro Females	1.11	1.24	1.62	0.67	0.96	0.61	0.69

TABLE 145

MEANS FOR SELECTED TREATMENT/NEED MEASURES BY
SEX AND LOCATION FOR 13-14 YEAR OLDS BY STUDY AREA

	Aust.	F.R.G.	Jap.	N.Z.	Nor.	U.S.A.	Canada (Ontario)
<u>Ratio of Successful Treatment to Total Need for Treatment</u>							
Total	0.60	0.48	0.43	0.93	0.90	0.74	0.87
Metro Males	0.61	0.46	0.48	0.91	0.90	0.73	0.88
Non-Metro Males	0.54	0.41	0.35	0.93	0.88	0.74	0.87
Metro Females	0.62	0.55	0.53	0.93	0.92	0.73	0.87
Non-Metro Females	0.64	0.48	0.37	0.94	0.92	0.76	0.88
<u>Ratio of Failed Treatment to Total Treatment Provided</u>							
Total	0.09	0.26	0.21	0.03	0.05	0.02	0.06
Metro Males	0.11	0.28	0.17	0.03	0.05	0.01	0.07
Non-Metro Males	0.11	0.28	0.23	0.03	0.07	0.02	0.06
Metro Females	0.06	0.24	0.18	0.03	0.04	0.02	0.07
Non-Metro Females	0.07	0.26	0.26	0.03	0.05	0.02	0.04

TABLE 146

DECAYED TEETH (UNMET NEED) AND
SUCCESSFULLY FILLED TEETH (MET NEED)
AS A PERCENT OF DMF FOR
13 - 14 YEAR OLDS BY STUDY AREA

	Percent Decayed Teeth	Percent Successfully Filled Teeth
Australia	34.0	54.1
Germany	35.9	44.5
Japan	46.3	40.9
New Zealand	3.8	92.7
Norway	4.8	87.2
U.S.A.	28.7	68.3
Canada	23.4	68.5

CHAPTER FIVE

INTRA-SAMPLE COMPARISON OF ADULTS

Background

When the preliminary results for the International Collaborative Study were first made available, there appeared to be startling differences in the oral health status of the students and the adults in some of the countries. For this reason, in designing the Ontario replication it was felt that an additional age group should be added to the sampling framework to bridge the gap between 14 and 35 years of age. Thus, in the Ontario study there are two adult age groups: 25 to 34 and 35 to 44 years old. All of the findings for the adult sample are presented by age group so that they can be compared directly with those of the other countries.

TABLE 147

DISTRIBUTION BY NUMBER AND PERCENT OF
ADULTS EXAMINED BY AGE GROUP AND SAMPLING AREA, ONTARIO SAMPLE, 1977

25 - 34 Year Olds		
Sampling Area	N	%
Toronto	205	46.5
Oshawa	92	20.9
Cornwall	42	9.5
Thunder Bay	102	23.1
Total	441	100.0
35 - 44 Year Olds		
Sampling Area	N	%
Toronto	262	37.3
Oshawa	174	24.8
Cornwall	61	8.7
Thunder Bay	205	29.2
Total	702	100.0

In terms of the total number in the sample, the target for 25-34 year olds was 600 and 441 were interviewed. For 35-44 year olds the target was 1,000 and 702 were interviewed (Table 147).

Four examiners were involved in conducting the oral examinations. The breakdown of examinations by examiner is contained in Table 148.

TABLE 148

DISTRIBUTION BY NUMBER AND PERCENT OF
EXAMINATIONS COMPLETED FOR EACH ADULT AGE GROUP BY EXAMINER
ONTARIO SAMPLE, 1977

Examiner	25 - 34 Year Olds		35 - 44 Year Olds	
	N	%	N	%
Hunt	87	19.7	123	17.5
Hausmanis	62	14.1	107	15.2
Krupanszky	153	34.7	224	31.9
Reiha	102	23.1	194	27.6
Ellis	23	5.2	29	4.1
Ambrozaitis	14	3.2	25	3.6
Total	441	100.0	702	100.0

As can be seen in Table 148 Dr. A.M. Hunt did a smaller proportion of the adult examinations than he did of the other two age groups. This was because as the Chief Epidemiologist he had to check every tenth student examination and the student and adult samples were done concurrently.

Oral Morbidity in the Total Sample

The next section provides some general information about the oral health status of the two adult age groups. Tables 149 to 153 present the means and standard deviations for selected oral morbidity measures for various subgroups within the adults. Some noteworthy differences are that the DMF for dentate 25-34 year olds is 13.43 and for dentate 35-44 year olds it is 15.47 (a two teeth difference). The increase in DMF over that ten year period seems to be accounted for by missing teeth (3.34 vs 6.00). In terms of oral hygiene indicators, there is not much difference in the number of teeth with gingivitis, (10.84 vs 10.28) but the older age group has over twice as much periodontitis (0.46 vs 1.12).

TABLE 149

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES
FOR ALL ADULTS¹, ONTARIO SAMPLE, 1977
(N=1,143)

Variable Name	$\bar{X}$	SD
Number of teeth present	22.71	8.74
Number of sound teeth present	12.02	7.04
Affected by caries (DMF)	15.45	7.15
Decayed teeth	0.87	1.80
Successfully filled teeth	7.36	6.11
Filled and needing further care	0.87	1.56
Missing teeth (Caries)	6.35	8.07
Missing teeth (Perio)	0.10	1.04
Teeth needing some treatment	1.80	2.47
Teeth needing restoration	1.64	2.28
Teeth needing extraction	0.16	0.76
Treatment over need ratio	0.72	0.32
Successful treatment over need	0.61	0.35
Failed treatment	0.15	0.26

¹ This includes both 25 - 34 year olds and 35 - 44 year old dentate and edentulous respondents. Oral hygiene indicators are not included as they are only reported for the dentate population.

TABLE 150

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES
FOR ALL 25 - 34 YEAR OLD ADULTS¹, ONTARIO SAMPLE, 1977
(N=441)

Variable Name	$\bar{X}$	SD
Number of teeth present	25.47	6.94
Number of sound teeth present	13.70	6.53
Affected by caries (DMF)	13.79	6.56
Decayed teeth	0.93	1.94
Successfully filled teeth	8.04	5.83
Filled and needing further care	0.84	1.46
Missing teeth (Caries)	4.00	6.35
Missing teeth (Perio)	0.23	0.37
Teeth needing some treatment	1.81	2.57
Teeth needing restoration	1.67	2.28
Teeth needing extraction	0.14	0.70
Treatment over need	0.73	0.32
Successful treatment over need	0.64	0.34
Failed treatment over treatment	0.13	0.23

¹ This includes both dentate and edentulous 25 - 34 year olds. However, the oral hygiene indicators are not included as they are only reported for the dentate population.

TABLE 151

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES
FOR DENTATE 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977
(N=428)

Variable Name	$\bar{X}$	SD
Number of teeth present	26.24	5.41
Number of sound teeth present	14.12	6.16
Affected by caries (DMF)	13.43	6.17
Decayed teeth	0.95	1.96
Successfully filled teeth	8.28	5.74
Filled and needing further care	0.86	1.48
Missing teeth (Caries)	3.34	4.99
Missing teeth (Perio)	0.03	0.38
Gingivitis	10.84	7.31
Periodontitis	0.46	1.73
Debris Index	0.67	0.48
Calculus Index	0.63	0.68
Periodontal Index	0.67	0.69
Mod. Periodontal Index	0.61	0.55
Oral Hygiene Index	1.33	0.96
Teeth needing some treatment	1.86	2.59
Teeth needing restoration	1.72	2.39
Teeth needing extraction	0.14	0.71
Treatment over need	0.72	0.32
Successful treatment over need	0.64	0.34
Failed treatment over treatment	0.12	0.23

TABLE 152

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES
FOR ALL 35 - 44 YEAR OLDS¹, ONTARIO SAMPLE, 1977
(N=702)

Variable Name	$\bar{X}$	SD
Number of teeth present	20.97	9.29
Number of sound teeth present	10.96	7.15
Affected by caries (DMF)	16.48	7.31
Decayed teeth	0.84	1.70
Successfully filled teeth	6.93	6.24
Filled and needing further care	0.89	1.61
Missing teeth (Caries)	7.83	8.67
Missing teeth (Perio)	0.14	1.30
Teeth needing some treatment	1.79	2.46
Teeth needing restoration	1.62	2.22
Teeth needing extraction	0.18	0.79
Treatment over need	0.71	0.32
Successful treatment over need	0.59	0.35
Failed treatment over treatment	0.16	0.28

¹ This includes both dentate and edentulous 35 - 44 year olds. Oral hygiene measures are not included as they are only reported for the dentate population.

TABLE 153

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES
FOR DENTATE 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977
(N=641)

<u>Variable Name</u>	<u>$\bar{X}$</u>	<u>SD</u>
Number of teeth present	22.97	6.97
Number of sound teeth present	12.01	6.60
Affected by caries (DMF)	15.47	6.67
Decayed teeth	0.92	1.76
Successfully filled teeth	7.59	6.14
Filled and needing further care	0.98	1.66
Missing teeth (Caries)	6.00	6.43
Missing teeth (Perio)	0.11	0.79
Gingivitis	10.28	6.96
Periodontitis	1.12	3.01
Debris Index	0.72	0.50
Calculus Index	0.85	0.77
Periodontal Index	0.96	1.05
Mod. Periodontal Index	0.81	0.72
Oral Hygiene Index	1.44	0.99
Teeth needing some treatment	1.96	2.46
Teeth needing restoration	1.77	2.26
Teeth needing extraction	0.19	0.83
Treatment over need	0.68	0.32
Successful treatment over need	0.58	0.34
Failed treatment over treatment	0.14	0.25

TABLE 154

DISTRIBUTION BY NUMBER AND PERCENT OF
DECAYED, MISSING, FILLED AND DMF TEETH FOR
DENTATE 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

Number of Teeth	Decayed		Missing		Filled		DMF	
	N	%	N	%	N	%	N	%
0	287	67.1	159	37.1	64	15.0	10	2.3
1	56	13.1	57	13.3	12	2.8	3	0.7
2	27	6.3	56	13.1	16	3.7	5	1.2
3	16	3.7	32	7.5	17	4.0	6	1.4
4	12	2.8	18	4.2	15	3.5	8	1.9
5	13	3.0	19	4.4	24	5.6	14	3.3
6	6	1.4	14	3.3	23	5.4	14	3.3
7	4	0.9	16	3.7	21	4.9	15	3.5
8	2	0.5	8	1.9	26	6.1	26	6.1
9	1	0.2	10	2.3	26	6.1	22	5.1
10	1	0.2	4	0.9	25	5.8	22	5.1
11	0	0.0	3	0.7	24	5.6	18	4.2
12	2	0.5	0	0.0	23	5.4	21	4.9
13	0	0.0	3	0.7	23	5.4	26	6.1
14	1	0.2	1	0.2	23	5.4	21	4.9
15	0	0.0	2	0.5	14	3.3	33	7.7
16	0	0.0	5	1.2	16	3.7	26	6.1
17	0	0.0	6	1.4	14	3.3	31	7.2
18	0	0.0	3	0.7	6	1.4	13	3.0
19	0	0.0	4	0.9	6	1.4	16	3.7
20+	0	0.0	8	1.9	10	2.4	78	18.2
Total	428	100.0	428	100.0	428	100.0	428	100.0
Edentulous (13)								
Total	441							

TABLE 155

DISTRIBUTION BY NUMBER AND PERCENT OF
DECAYED, MISSING, FILLED AND DMF TEETH
FOR DENTATE 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

Number of Teeth	Decayed		Missing		Filled		DMF	
	N	%	N	%	N	%	N	%
0	403	62.9	125	19.5	119	18.6	7	1.1
1	113	17.6	59	9.2	42	6.6	16	2.5
2	51	8.0	59	9.2	24	3.7	12	1.9
3	22	3.4	60	9.4	27	4.2	12	1.9
4	16	2.5	46	7.2	29	4.5	10	1.6
5	9	1.4	42	6.6	25	3.9	9	1.4
6	10	1.6	31	4.8	33	5.1	9	1.4
7	8	1.2	37	5.8	36	5.6	14	2.2
8	3	0.5	26	4.1	33	5.1	17	2.7
9	2	0.3	22	3.4	26	4.1	10	1.6
10	3	0.5	14	2.2	38	5.9	24	3.7
11	1	0.2	12	1.9	27	4.2	24	3.7
12	0	0.0	13	2.0	24	3.7	34	5.3
13	0	0.0	3	0.5	36	4.1	28	4.4
14	0	0.0	6	0.9	30	4.7	37	5.8
15	0	0.0	3	0.5	19	3.0	31	4.8
16	0	0.0	10	1.6	22	3.4	28	4.4
17	0	0.0	9	1.4	20	3.1	31	4.8
18	0	0.0	11	1.7	10	1.6	35	5.5
19	0	0.0	15	2.3	14	2.2	45	7.0
20+	0	0.0	36	5.6	17	2.8	208	32.5
Total	641	100.0	641	100.0	641	100.0	641	100.0
Edentulous	(61)							
Total	702							

TABLE 156

DISTRIBUTION BY NUMBER AND PERCENT OF
OF TEETH NEEDING ANY TREATMENT, RESTORATION AND EXTRACTION
FOR DENTATE 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

Number Of Teeth	Any Treatment		Restoration		Extraction	
	N	%	N	%	N	%
0	174	40.7	178	41.6	396	92.5
1	80	18.7	84	19.6	24	5.6
2	60	14.0	59	13.8	2	0.5
3	37	8.6	39	9.1	1	0.2
4	20	4.7	18	4.2	1	0.2
5	25	5.8	24	5.6	2	0.5
6	9	2.1	7	1.6	1	0.2
7	6	1.4	5	1.2	0	0.0
8	6	1.4	4	0.9	0	0.0
9	1	0.2	1	0.2	1	0.2
10+	10	2.2	9	2.1	0	0.0
Total Edentulous	428 (13)	100.0	428	100.0	428	100.0
Total	441					

TABLE 157

DISTRIBUTION BY NUMBER AND PERCENT OF
TEETH NEEDING ANY TREATMENT, RESTORATION AND EXTRACTION
FOR DENTATE 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

Number of Teeth	Any Treatment		Restoration		Extraction	
	N	%	N	%	N	%
0	234	36.5	246	38.4	583	91.0
1	140	21.8	147	22.9	29	4.5
2	88	13.7	84	13.1	15	2.3
3	49	7.6	46	7.2	7	1.1
4	34	5.3	39	6.1	2	0.3
5	29	4.5	29	4.5	2	0.3
6	20	3.1	16	2.5	1	0.2
7	15	2.3	10	1.6	1	0.2
8	16	2.5	11	1.7	0	0.0
9	5	0.8	5	0.8	0	0.0
10	11	1.7	8	1.3	1	0.2
Total	641	100.0	641	100.0	641	100.0
Edentulous	(61)					
Total	702					

TABLE 158

DISTRIBUTION BY NUMBER AND PERCENT OF
SCORES ON ORAL HYGIENE, DEBRIS, CALCULUS, AND PERIODONTAL INDICES
FOR DENTATE 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

Index Score	Oral Hygiene		Debris Index		Calculus Index		Periodontal Index	
	N	%	N	%	N	%	N	%
0.00 - 0.05	41	9.6	41	9.6	130	30.4	52	12.1
0.05 - 0.25	32	7.5	33	7.7	33	7.7	75	17.5
0.25 - 0.45	1	0.2	73	17.1	58	13.6	74	17.3
0.45 - 0.65	72	16.8	68	15.9	29	6.8	73	17.1
0.65 - 0.85	65	15.2	107	25.0	52	12.1	44	10.3
0.85 - 1.05	4	0.9	42	9.8	24	5.6	43	10.0
1.05 - 1.25	59	13.8	17	4.0	23	5.4	18	4.2
1.25 - 1.45	10	2.3	14	3.3	14	3.3	12	2.8
1.45 - 1.65	38	8.9	10	2.3	18	4.2	12	2.8
1.65 - 1.85	42	9.8	11	2.6	23	5.4	8	1.9
1.85 - 2.05	60	14.0	8	1.9	12	2.8	12	2.8
2.05 - 4.05	4	0.9	4	0.9	12	2.8	4	0.9
4.05 - 6.05	0	0.0	0	0.0	0	0.0	1	0.2
6.05 +	0	0.0	0	0.0	0	0.0	0	0.0
Total	428	100.0	428	100.0	428	100.0	428	100.0
Edentulous	(13)							
Total	441							

TABLE 159

DISTRIBUTION BY NUMBER AND PERCENT OF
SCORES ON ORAL HYGIENE, CALCULUS AND PERIODONTAL INDICES
FOR DENTATE 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

Index Score	Oral Hygiene		Debris Index		Calculus Index		Periodontal Index	
	N	%	N	%	N	%	N	%
0.00 - 0.05	55	8.6	55	8.6	144	22.5	57	8.9
0.05 - 0.25	32	5.0	42	6.6	52	8.1	92	14.4
0.25 - 0.45	10	1.6	92	14.4	57	8.9	96	15.0
0.45 - 0.65	92	14.4	120	18.8	34	5.3	85	13.3
0.65 - 0.85	98	15.3	135	21.1	82	12.8	70	11.0
0.85 - 1.05	22	3.4	78	12.2	56	8.8	61	9.5
1.05 - 1.25	70	11.0	32	5.0	21	3.3	41	6.4
1.25 - 1.45	24	3.8	30	4.7	34	5.3	34	5.3
1.45 - 1.65	42	6.6	20	3.1	23	3.6	31	4.9
1.65 - 1.85	77	12.1	11	1.7	49	7.7	14	2.2
1.85 - 2.05	107	16.7	14	2.2	49	7.7	19	3.0
2.05 - 4.05	10	1.6	10	1.6	38	5.9	37	5.8
4.05 - 6.05	0	0.0	0	0.0	0	0.0	2	0.3
6.05 +	0	0.0	0	0.0	0	0.0	0	0.0
Total	639	100.0	639	100.0	639	100.0	639	100.0
Edentulous	(61)							
Total	700							

Differences in Oral Morbidity by Selected Characteristics

For the adults the three factors which have been identified as having an impact on oral health status for the purpose of analysis are age, sex and location. In terms of location, Toronto and Oshawa are categorized as metropolitan regions and Cornwall and Thunder Bay as non-metropolitan regions.

Age, Sex and Location

Description of Findings

The dentate 25-34 year olds had a mean number of (26.24) teeth present. The metropolitan group had almost three more teeth present than the non-metropolitan group (27.12 vs. 24.33). Males in the metropolitan region had more teeth present than females but females in the non-metropolitan region had more teeth (24.53) than the males.

The 35-44 year old dentate adults had 22.97 teeth with the metropolitan group having an average of 2 more teeth present than the non-metropolitan group (23.73 vs. 21.58). Males and females followed the same pattern as in the younger age group with metro males having more teeth than metro females (24.05 vs. 21.85).

The 25-34 year old dentate adults had 14.12 sound teeth present and the 35-44 year olds had 12.01 sound teeth (Table 161). In both age groups the metropolitan residents had more sound teeth than the non-metropolitan residents and the males in both locations had higher numbers than the females.

Table 162 presents the total DMF data for the dentate population. There was a two teeth difference in the DMF index between the younger and older age groups (13.43 vs. 15.47). The metropolitan group had a lower number of DMF teeth than the non-metropolitan group in both age groups. The males had lower DMF tooth values than the females in both age groups and locations.

The younger age group had a slightly higher number of decayed teeth than the older age group (0.95 vs. 0.92) (Table 163). Within the 25-34 year old group the metro group (1.00) had more decayed teeth than the non-metro group (0.85). Males in both locations had more decayed teeth than the females. The same difference between the sexes existed in the 35-44 year old group.

The 25-34 year olds had more successfully filled teeth with 8.25 than the 35-44 year olds with 7.59 (Table 164). Regardless of location or age group males had substantially fewer filled teeth than females. In both age groups the metropolitan group had fewer filled teeth than the non-metropolitan groups.

Table 165 indicates that the 25-34 year old group had marginally fewer teeth filled and needing further treatment than the older age group (0.86 vs. 0.98). In both age groups the metropolitan residents had a higher average number of teeth in this category than the non-metropolitan residents. Regardless of location or age group males had slightly more teeth in this category than females but only in the non-metropolitan 35-44 year olds was the difference significant.

The 35-44 year olds had over one and a half more missing teeth than the 25-34 year olds (5.00 vs. 3.34) (Table 166). For both age

groups the metro group had significantly fewer teeth missing than the non-metro. In the 25-34 year age group, males in both locations had more teeth missing than females, but in the 35-44 year age group metropolitan females had slightly more missing teeth than the males, and in the non-metropolitan area males had more than females.

As Table 167 indicates the number of teeth missing due to periodontal disease was very small, probably because the designation of missing due to caries or periodontal disease usually had to be based on examiner judgement. Often the patient was uncertain of the reason for tooth loss and thus the examiner usually categorized the tooth as missing due to caries. Only the metropolitan 35-44 year old subjects and the edentulous subjects had recordable numbers of teeth missing for periodontal reasons.

Table 168 presents the findings for the first oral hygiene measure; the number of teeth with gingivitis. There is virtually no difference between age groups. The only substantial difference of note was found between the 25-34 year old metropolitan males with 11.50 and females with 9.56 teeth with gingivitis.

The numbers of teeth with periodontitis was very low in all groups (Table 169). Within this framework, the older age group had average values more than twice as high as the younger age group (1.12 vs. 0.46). For both age groups the metropolitan group had a higher value than the non-metropolitan group. In the 25-34 year olds the metro males had higher numbers than the females (0.81 vs. 0.29). For the 25-34 year age group in both locations males had higher numbers of teeth with periodontitis than females.

There was no significant difference in debris scores between the 25-34 and 35-44 year old groups (Table 170). In both age groups the metropolitan males had the highest debris scores and the non-metropolitan females had the lowest scores.

The younger age group had less calculus than the older age group (0.63 vs. 0.85) (Table 171). Although the average value for metro and non-metro residents is the same for the 25-34 year olds (0.63), the values for males is almost twice as high as for females (0.84 vs. 0.47). In the older age group the metropolitan and the non-metropolitan males have higher values than the females.

Tables 172 and 173 present the findings for the periodontal and modified periodontal indices. On both indices the older age group had higher values than the younger group. In the 25-34 year olds the metropolitan group had lower values than the non-metropolitan but the opposite trend was true in the older age group. Except for 25-34 year old non-metropolitan residents males had higher values than females on both indices.

The 25-34 year olds had slightly lower average oral hygiene index values than the 35-44 year olds (1.33 vs. 1.44). The metropolitan males had the highest values (1.61 and 1.69). The 25-34 year old metro females had the lowest values (1.19).

Tables 175 to 177 present data related to the need for treatment. The younger age group in general needed less treatment than the older group (1.86 teeth vs. 1.96 teeth) (Table 175). On both specific treatment measures, restorations (Table 176) and extractions (Table 177) the younger age group required less treatment.

On all three measures of treatment for both age groups the following trends were present. The metropolitan residents needed more treatment than the non-metropolitan. Males in both locations needed more treatment than females.

Tables 178 to 180 present the findings for the treatment need ratios. In terms of all treatment received over all treatment ever needed the 25-34 year olds had a slightly greater amount of work completed than the 35-44 year olds (0.72 vs. 0.68). In both age groups the females had higher ratios than males in all locations, regardless of age category.

For successful treatment over all treatment ever needed (Table 179) the younger age group had a slightly higher ratio than the older age group (0.64 vs. 0.58). Females in both locations and in both age groups had higher ratios than males.

Table 180 indicates that the 25-34 year olds had about the same amount of failed treatment as the 35-44 year olds (0.12 vs. 0.14). Regardless of age group or location males had a greater need for retreatment than females.

TABLE 160

MEANS AND STANDARD DEVIATIONS FOR THE NUMBER OF TEETH
PRESENT BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	22.71	8.74
25-34 year olds			
Dentate	428	26.24	5.41
Metro	293	27.12	4.23
males	130	27.28	4.13
females	163	27.00	4.32
Non-Metro	135	24.33	6.98
males	63	24.11	7.55
females	72	24.53	6.49
35-44 year olds			
Dentate	641	22.97	6.97
Metro	414	23.73	6.50
males	191	24.05	6.60
females	223	23.46	6.41
Non-Metro	227	21.58	7.59
males	104	21.25	7.65
females	123	21.85	7.55

TABLE 161
MEANS AND STANDARD DEVIATIONS FOR THE NUMBER OF SOUND TEETH
PRESENT BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	12.02	7.04
25-34 year olds			
Dentate	428	14.12	6.16
Metro	293	14.84	6.01
males	130	16.11	6.26
females	163	13.82	5.62
Non-Metro	135	12.56	6.22
males	63	12.57	6.87
females	72	12.56	5.65
35-44 year olds			
Dentate	641	12.01	6.60
Metro	414	12.88	6.81
males	191	13.48	7.13
females	223	12.37	6.51
Non-Metro	227	10.41	5.87
males	104	10.83	6.41
females	123	10.07	5.37

TABLE 162

MEANS AND STANDARD DEVIATION FOR TEETH AFFECTED BY CARIES (DMF)
BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	15.45	7.15
25-34 year olds			
Dentate	428	13.43	6.17
Metro	293	12.68	6.02
males	130	11.47	6.34
females	163	13.65	5.59
Non-Metro	135	15.04	6.21
males	63	14.97	6.90
females	72	15.11	5.59
35-44 year olds			
Dentate	641	15.47	6.67
Metro	414	14.51	6.80
males	191	13.90	7.06
females	223	15.04	6.53
Non-Metro	227	17.23	6.05
males	104	16.58	6.61
females	123	17.78	5.49

TABLE 163

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF DECAYED TEETH
BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	0.87	1.80
25-34 year olds			
Dentate	428	0.95	1.96
Metro	293	1.00	1.92
males	130	1.33	2.22
females	163	0.74	1.59
Non-Metro	135	0.85	2.06
males	63	1.22	2.73
females	72	0.53	1.13
35-44 year olds			
Dentate	641	0.92	1.76
Metro	414	0.91	1.68
males	191	1.34	1.82
females	223	0.72	1.53
Non-Metro	227	0.93	1.90
males	104	1.08	1.98
females	123	0.80	1.82

TABLE 164

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF SUCCESSFULLY FILLED TEETH
BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	7.36	6.11
25-34 year olds			
Dentate	428	8.28	5.74
Metro	293	8.19	5.68
males	130	6.42	5.35
females	163	9.61	5.54
Non-Metro	135	8.47	5.89
males	63	7.54	5.59
females	72	9.28	6.06
35-44 year olds			
Dentate	641	7.59	6.14
Metro	414	7.21	5.82
males	191	6.45	5.68
females	223	7.87	5.87
Non-Metro	227	8.28	6.64
males	104	6.97	6.03
females	123	9.39	4.94

TABLE 165

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF FILLED TEETH
NEEDING FURTHER TREATMENT BY AGE, LOCATION AND SEX
FOR DENTATE POPULATION, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	0.87	1.56
25-34 year olds			
Dentate	428	0.86	1.48
Metro	293	0.94	1.51
males	130	0.97	1.62
females	163	0.91	1.43
Non-Metro	135	0.70	1.39
males	63	0.76	1.69
females	72	0.62	1.08
35-44 year olds			
Dentate	641	0.98	1.66
Metro	414	1.11	1.80
males	191	1.13	1.90
females	223	1.10	1.71
Non-Metro	227	0.74	1.36
males	104	0.97	1.70
females	123	0.54	0.94

TABLE 166

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF TEETH MISSING
BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	6.35	8.07
25-34 year olds			
Dentate	428	3.34	4.99
Metro	293	2.56	3.76
males	130	2.75	3.76
females	163	2.40	3.77
Non-Metro	135	5.05	6.65
males	63	5.46	7.19
females	72	4.65	6.16
35-44 year olds			
Dentate	641	6.00	6.43
Metro	414	5.29	5.90
males	191	5.21	5.91
females	223	5.36	5.90
Non-Metro	227	7.29	7.14
males	104	7.56	7.07
females	123	7.06	7.22

TABLE 167

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF TEETH
LOST FOR PERIODONTAL REASONS BY AGE, LOCATION AND SEX
FOR DENTATE POPULATION, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	0.10	1.04
25-34 year olds			
Dentate	428	0.03	0.38
Metro	293	0.04	0.46
males	130	0.04	0.32
females	163	0.04	0.55
Non-Metro	135	0.00	0.00
males	63	0.00	0.00
females	72	0.00	0.00
35-44 year olds			
Dentate	641	0.11	0.79
Metro	414	0.17	0.97
males	191	0.18	1.00
females	223	0.16	0.95
Non-Metro	227	0.01	0.09
males	104	0.01	0.10
females	123	0.01	0.09

TABLE 168

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF TEETH
WITH GINGIVITIS BY AGE, LOCATION AND SEX
FOR DENTATE POPULATION, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	9.28	7.34
25-34 year olds			
Dentate	428	10.84	7.31
Metro	293	10.42	7.20
males	130	11.50	7.61
females	163	9.56	6.74
Non-Metro	135	11.75	7.49
males	63	11.97	7.79
females	72	11.56	7.27
35-44 year olds			
Dentate	641	10.28	6.96
Metro	414	10.16	7.15
males	191	10.15	7.30
females	223	9.87	7.01
Non-Metro	227	10.48	6.61
males	104	10.90	7.29
females	123	10.13	5.99

TABLE 169

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF TEETH
WITH PERIODONTITIS BY AGE, LOCATION AND SEX
FOR DENTATE POPULATION, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	0.80	2.52
25-34 year olds			
Dentate	428	0.46	1.73
Metro	293	0.52	1.98
males	130	0.81	2.69
females	163	0.29	1.09
Non-Metro	135	0.33	0.96
males	63	0.29	0.79
females	72	0.38	1.09
35-44 year olds			
Dentate	641	1.12	3.01
Metro	414	1.32	3.33
males	191	1.87	3.96
females	223	0.84	2.59
Non-Metro	227	0.74	2.29
males	104	1.20	3.08
females	123	0.36	1.18

TABLE 170

MEANS AND STANDARD DEVIATIONS FOR DEBRIS SCORE
BY AGE, LOCATION AND SEX
FOR DENTATE POPULATION, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	0.65	0.51
25-34 year olds			
Dentate	428	0.67	0.48
Metro	293	0.69	0.49
males	130	0.81	0.53
females	163	0.60	0.44
Non-Metro	135	0.61	0.46
males	63	0.64	0.51
females	72	0.59	0.41
35-44 year olds			
Dentate	641	0.72	0.50
Metro	414	0.78	0.50
males	191	0.84	0.54
females	223	0.72	0.45
Non-Metro	227	0.60	0.48
males	104	0.71	0.56
females	123	0.52	0.38

TABLE 171

MEANS AND STANDARD DEVIATIONS FOR CALCULUS SCORE
BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	0.72	9.74
25-34 year olds			
Dentate	428	0.63	0.69
Metro	293	0.63	0.68
males	130	0.84	0.76
females	163	0.47	0.56
Non-Metro	135	0.63	0.67
males	63	0.63	0.67
females	72	0.63	0.68
35-44 year olds			
Dentate	641	0.85	0.77
Metro	414	0.88	0.77
males	191	0.98	0.78
females	223	0.80	0.75
Non-Metro	227	0.80	0.77
males	104	0.91	0.83
females	123	0.71	0.71

TABLE 172

MEANS AND STANDARD DEVIATIONS FOR MODIFIED PERIODONTAL SCORE
BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	0.73	0.67
25-34 year olds			
Dentate	428	0.61	0.55
Metro	293	0.58	0.57
males	130	0.71	0.69
females	163	0.49	0.44
Non-Metro	135	0.68	0.51
males	63	0.67	0.50
females	72	0.69	0.52
35-44 year olds			
Dentate	641	0.81	0.72
Metro	414	0.82	0.76
males	191	0.95	0.85
females	223	0.70	0.66
Non-Metro	227	0.79	0.64
males	104	0.89	0.71
females	123	0.71	0.56

TABLE 173

MEANS AND STANDARD DEVIATIONS FOR PERIODONTAL SCORE
BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	0.85	0.93
25-34 year olds			
Dentate	428	0.67	0.69
Metro	293	0.65	0.74
males	130	0.79	0.92
females	163	0.53	0.53
Non-Metro	135	0.72	0.58
males	63	0.71	0.57
females	72	0.73	0.59
35-44 year olds			
Dentate	641	0.96	1.05
Metro	414	0.99	1.10
males	191	1.20	1.28
females	223	0.81	1.89
Non-Metro	227	0.91	0.93
males	104	1.07	1.05
females	123	0.78	0.80

TABLE 174

MEANS AND STANDARD DEVIATIONS FOR ORAL HYGIENE INDEX
BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	1.29	0.98
25-34 year olds			
Dentate	428	1.33	0.96
Metro	293	1.38	0.98
males	130	1.61	1.06
females	163	1.19	0.88
Non-Metro	135	1.23	0.91
males	63	1.27	1.02
females	72	1.19	0.82
35-44 year olds			
Dentate	641	1.44	0.98
Metro	414	1.55	0.99
males	191	1.69	1.07
females	223	1.44	0.96
Non-Metro	227	1.22	0.96
males	104	1.43	1.12
females	123	1.04	0.76

TABLE 175

MEANS AND STANDARD DEVIATIONS FOR
NUMBER OF TEETH NEEDING SOME TREATMENT
BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	1.80	2.47
25-34 year olds			
Dentate	428	1.86	2.59
Metro	293	2.00	2.56
males	130	2.42	3.02
females	163	1.66	2.08
Non-Metro	135	1.56	2.63
males	63	2.00	3.47
females	72	1.18	1.49
35-44 year olds			
Dentate	641	1.96	2.46
Metro	414	2.10	2.43
males	191	2.36	2.56
females	223	1.88	2.29
Non-Metro	227	1.71	2.50
males	104	2.13	2.92
females	123	1.35	2.02

TABLE 176

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF TEETH
NEEDING RESTORATION
BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	1.64	2.28
25-34 year olds			
Dentate	428	1.72	2.39
Metro	293	1.84	2.33
males	130	2.15	2.69
females	163	1.59	1.97
Non-Metro	135	1.47	2.49
males	63	1.83	3.26
females	72	1.15	1.50
35-44 year olds			
Dentate	641	1.77	2.26
Metro	414	1.91	2.27
males	191	2.12	2.43
females	223	1.73	2.11
Non-Metro	227	1.52	2.22
males	104	1.88	2.64
females	123	1.22	1.75

TABLE 177

MEANS AND STANDARD DEVIATIONS FOR NUMBER OF TEETH
NEEDING EXTRACTION
BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	0.16	0.76
25-34 year olds			
Dentate	428	0.14	0.71
Metro	293	0.16	0.80
males	130	0.28	1.05
females	163	0.07	0.50
Non-Metro	135	0.10	0.47
males	63	0.17	0.66
females	72	0.03	0.17
35-44 year olds			
Dentate	641	0.19	0.83
Metro	414	0.19	0.73
males	191	0.24	0.73
females	223	0.15	0.73
Non-Metro	227	0.19	0.98
males	104	0.26	1.26
females	123	0.13	0.66

TABLE 178

MEANS AND STANDARD DEVIATIONS FOR RATIO OF
ALL TREATMENT RECEIVED OVER ALL TREATMENT EVER NEEDED
BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	0.72	0.32
25-34 year olds			
Dentate	428	0.72	0.32
Metro	293	0.71	0.34
males	130	0.61	0.38
females	163	0.79	0.29
Non-Metro	135	0.74	0.27
males	63	0.70	0.30
females	72	0.78	0.24
35-44 year olds			
Dentate	641	0.68	0.32
Metro	414	0.67	0.34
males	191	0.65	0.34
females	223	0.69	0.33
Non-Metro	227	0.70	0.30
males	104	0.66	0.32
females	123	0.74	0.27

TABLE 179

MEANS AND STANDARD DEVIATIONS FOR RATIO OF
SUCCESSFUL TREATMENT OVER ALL TREATMENT EVER NEEDED
BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	0.61	0.35
25-34 year olds			
Dentate	428	0.64	0.34
Metro	293	0.63	0.35
males	130	0.53	0.37
females	163	0.72	0.31
Non-Metro	135	0.64	0.33
males	63	0.59	0.34
females	72	0.69	0.31
35-44 year olds			
Dentate	641	0.58	0.34
Metro	414	0.57	0.34
males	191	0.53	0.35
females	223	0.60	0.33
Non-Metro	227	0.61	0.33
males	104	0.53	0.36
females	123	0.68	0.30

TABLE 180

MEANS AND STANDARD DEVIATIONS FOR RATIO OF
FAILED TREATMENT OVER ALL TREATMENT PROVIDED
BY AGE, LOCATION AND SEX FOR DENTATE POPULATION
ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD
Total	1,143	0.15	0.26
25-34 year olds			
Dentate	428	0.12	0.23
Metro	293	0.12	0.21
males	130	0.15	0.26
females	163	0.09	0.16
Non-Metro	135	0.14	0.27
males	63	0.16	0.29
females	72	0.12	0.26
35-44 year olds			
Dentate	641	0.14	0.25
Metro	414	0.15	0.24
males	191	0.16	0.27
females	223	0.13	0.22
Non-Metro	227	0.14	0.27
males	104	0.19	0.33
females	123	0.09	0.21

Analysis of Differences

The previous section has described the differences that exist in the oral morbidity measures by age, sex and location. This section will evaluate whether the differences are statistically significant using the Student's t-test and analysis of variance.

Table 181 presents the significant differences for selected oral morbidity measures using the Student's t-test. In terms of the effect of age on oral health status on all the indicators where there is a difference the 25-34 year olds fare better than the 35-44 year olds. The younger age group has fewer significant differences between the metropolitan and non-metropolitan groups than does the older age group. The differences that exist are generally in the direction of the metropolitan group having a better oral health status than the non-metropolitan group in terms of caries measures. For oral hygiene indicators the non-metropolitan group has better scores than the metropolitan. There are many significant differences between males and females in the metropolitan areas in both age groups on the oral health morbidity measures. Generally speaking, the oral health status of females is better than males as operationalized by the caries measures and the oral hygiene indicators. In addition the males need more treatment and what treatment they have had has not been as successful as the females'.

The differences between males and females in the non-metropolitan area follows the same pattern as for the 35-44 year old group in the metropolitan group. In the 25-34 year old age group there are few differences between males and females in the non-metropolitan group.

Males have more decayed teeth and more need for treatment than the females, but otherwise there are no significant differences.

Analysis of variance was the other statistical technique used to determine whether differences were significant. Tables 182 to 187 present the ANOVA findings. It would appear for the 25-34 year olds location is a significant factor in number of teeth present, number of sound teeth, DMF, missing teeth and treatment needed. In this same age group sex is a significant factor in all of the oral hygiene indicators, all of the treatment need measures and many of the caries indicators (sound teeth, DMF, decayed teeth, and successfully filled).

For the 35-44 year old group the pattern is different. Location is significant in most of the caries measures (teeth present, sound teeth, DMF, filled and needing further care, and missing teeth). For periodontitis, debris, oral hygiene, treatment needed and restorations needed it is also a significant determinant.

In this age group many differences by sex are also statistically significant. In the caries measures this includes number of sound teeth, DMF, number of successfully filled teeth and number of decayed teeth. In the oral hygiene measures all but gingivitis have significant differences between males and females. For treatment needed and restorations there are also significant differences by sex.

TABLE 181

SIGNIFICANT DIFFERENCES USING THE STUDENT'S T - TEST
BY AGE, SEX AND LOCATION FOR SELECTED ORAL MORBIDITY MEASURES
FOR DENTATE ADULTS, ONTARIO SAMPLE, 1977

Variable	25 - 34 vs. 35 - 44	25 - 34 year olds			35 - 44 year olds		
		Metro Non- Metro	Non- Metro Male Female	Metro Male Female	Metro Non- Metro	Metro Male Female	Non- Metro Male Female
Number of teeth present	*	*			*		
Number of sound teeth	*	*	*		*		
Affected by caries (DMF)	-*	-*	-*		*		
Decayed teeth			*	*		*	
Successfully filled teeth			-*			-*	-*
Filled & needing further care	-*				*		*
Missing teeth (caries)	-*	-*			-*		
Missing teeth (perio)	-*				*		
Gingivitis		*					
Periodontitis	-*		*		*	*	*
Debris Index			*		*	*	*
Calculus Index	-*		*			*	*
Periodontal Index	-*		*			*	*
Mod. Periodontal Index	-*		*			*	*
Oral Hygiene Index	-*		*		*	*	*
Some treatment			*		*	*	*
Restoration			*		*	*	*
Extraction			*				
Treatment need	*		-*	-*			-*
Successful treatment	*		-*	-*		-*	-*
Failed treatment	-*		*				*

TABLE 182

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
SELECTED ORAL MORBIDITY MEASURES
AS THE DEPENDENT VARIABLES AND LOCATION AND SEX AS THE INDEPENDENT VARIABLES
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name	Total Main Effects (Additive)	Separate Main Effects (Unique)		Total 2 Way Interaction
		Location	Sex	
Present teeth	0.000	0.000	0.686	0.901
Sound teeth	0.000	0.000	0.008	0.165
Affected by caries (DMF)	0.000	0.000	0.016	0.284
Successfully filled	0.000	0.848	0.000	0.119
Filled, needing further care	0.180	0.077	0.571	0.822
Decayed teeth	0.003	0.314	0.001	0.806
Teeth lost due to periodontitis	0.568	0.290	0.932	0.953
Missing teeth	0.000	0.000	0.486	0.657

TABLE 183

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
SELECTED ORAL MORBIDITY
AS THE DEPENDENT VARIABLES AND LOCATION AND SEX AS THE INDEPENDENT VARIABLES
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name	Total Main Effects (Additive)	Separate Main Effects (Unique)		Total 2 Way Interaction
		Location	Sex	
Gingivitis	0.064	0.43	0.033	0.456
Periodontitis	0.075	0.237	0.050	0.092
Debris	0.001	0.109	0.001	0.092
Calculus	0.001	0.898	0.000	0.009
Periodontal Score	0.008	0.122	0.008	0.038
Modified Perio. Score	0.017	0.295	0.009	0.042
Oral Hygiene Index	0.000	0.407	0.000	0.013

TABLE 184

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
SELECTED ORAL MORBIDITY MEASURES
AS THE DEPENDENT VARIABLES AND LOCATION AND SEX AS THE INDEPENDENT VARIABLES
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name	Total Main Effects (Additive)	Separate Main Effects (Unique)		Total 2 Way Interaction
		Location	Sex	
Number of teeth needing some treatment	0.001	0.047	0.002	0.894
Number of teeth needing restoration	0.007	0.063	0.009	0.779
Number of teeth needing extraction	0.014	0.319	0.006	0.647

TABLE 185

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
 SELECTED ORAL MORBIDITY MEASURES
 AS THE DEPENDENT VARIABLES AND LOCATION AND SEX AS THE INDEPENDENT VARIABLES
 FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name	Total Main Effects (Additive)	Separate Main Effects (Unique)		Total 2 Way Interaction
		Location	Sex	
Present teeth	0.000	0.000	0.320	0.854
Sound teeth	0.000	0.000	0.028	0.819
Affected by caries (DMF)	0.000	0.000	0.027	0.624
Successfully filled	0.010	0.693	0.003	0.825
Filled needing further care	0.001	0.001	0.141	0.121
Decayed teeth	0.019	0.616	0.006	0.702
Teeth lost due to periodontitis	0.082	0.030	0.555	0.636
Missing teeth	0.000	0.000	0.651	0.626

TABLE 186

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
SELECTED ORAL MORBIDITY MEASURES
AS THE DEPENDENT VARIABLES AND LOCATION AND SEX AS THE INDEPENDENT VARIABLES
FOR 35 - 44 YEAR OLDS, ONTARIO SMAPLE, 1977

Variable Name	Total Main Effects (Additive)	Separate Main Effects (Unique)		Total 2 Way Interaction
		Location	Sex	
Gingivitis	0.123	0.225	0.105	0.536
Periodontitis	0.000	0.007	0.000	0.641
Debris	0.000	0.000	0.000	0.364
Calculus	0.003	0.253	0.002	0.848
Periodontal Score	0.000	0.669	0.000	0.594
Modified Perio. Score	0.000	0.362	0.000	0.533
Oral Hygiene Index	0.000	0.011	0.000	0.601

TABLE 187

LEVELS OF SIGNIFICANCE FOR TWO WAY ANALYSIS OF VARIANCE WITH
SELECTED ORAL MORBIDITY MEASURES
AS THE DEPENDENT VARIABLES AND LOCATION AND SEX AS THE INDEPENDENT VARIABLES
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

Variable Name	Total Main Effects (Additive)	Separate Main Effects (Unique)		Total 2 Way Interaction
		Location	Sex	
Number of teeth needing some treatment	0.000	0.005	0.001	0.381
Number of teeth needing restoration	0.000	0.003	0.004	0.402
Number of teeth needing extraction	0.244	0.749	0.010	0.752

CHAPTER SIX

INTER COUNTRY COMPARISON OF ADULTS

The adult sample of the Ontario replication differed from the adult samples in the other countries in that a younger age group (25-34 year olds was also sampled. For the purposes of comparison only the 35-44 year old group will be considered.

It should be remembered that each of these study areas represents different combinations of structural variables as outlined in Chapter Two of Part I. In addition, within each country the populations have had differing dental experiences. For example, many of the adults in New Zealand and Norway did not benefit from the school dental programmes. Likewise, in Ontario most of the adults were too old to have benefited from the fluoridation of water supplies.

Table 188 presents the comparative figures on caries measures. Overall Ontario had a similar total DMF to the United States (15.47 and 15.82 respectively). Japan had the lowest DMF (10.47) and coupled with the fact that edentulousness is virtually non-existent in that country, it would appear that on the most general indicators Japan has the best oral health status.

However, when one looks at the specific components of DMF, notably decayed teeth, that evaluation changes. Japan had the highest number of decayed teeth (1.91) and Australia the lowest (0.67). Ontario was somewhere in the middle (0.92).

As for missing teeth, again, Japan had the lowest number, (2.42). Ontario was in the middle (6.00) and Australia had the highest number (8.27).

For successfully filled teeth, Norway had the highest number (12.92), Japan the lowest (4.41) and Ontario had a middle position (7.59).

Japan had the highest number of teeth filled and needing further treatment (2.00) and Australia had the lowest number (0.68). Ontario had the second lowest position on this caries measure (0.98).

For the oral hygiene measures (Tables 189 and 190), although Ontario adults had a relatively high scores on debris and calculus, they had the lowest periodontal scores and the lowest number of teeth with gingivitis. For periodontitis the Ontario adults had the second lowest mean number (1.12) next to New Zealand (0.98). For teeth lost due to periodontal disease Ontario had a middle position (0.11) between the extremes of Norway (0.04) and Japan (0.32). One problem with this last indicator is that often the examiner had to rely on the patient's report of the reason for the loss of the tooth. The examiner also made his/her own evaluation or scored it as missing due to caries.

Table 191 provides information comparing the delivery systems. In terms of successful treatment Ontario with 0.58 is the second lowest next to Japan (0.52). For failed treatment Ontario (0.15) is between New Zealand (0.06) and Japan (0.27). Caution should be exercised in interpreting these ratios in that edentulousness and missing teeth in the population can bias the results. Missing teeth are not included in the calculation of these ratios. The fewer missing teeth, the more teeth available for decay.

The final measure is the Combined Status Ratio and it attempts to evaluate the overall effectiveness of the dental system in terms of

oral health status and service needs. The score ranges from zero for the perfectly healthy mouth to one for mouths that have a very poor oral health status or need a great deal of work.

As the table indicates there is not much difference among the countries on this indicator. Ontario had the second lowest value (0.50) next to Norway (0.47). The United States had the highest, (0.61).

Table 192 examines the proportion of DMF that is made up of decayed, missing and successfully filled teeth. The values for Ontario were in the middle range for each of these components. It is interesting to note that although Japan had no edentulous respondents, a substantial proportion of the DMF is composed of unmet need.

Edentulousness

At 25 to 34 years of age, 2.9 percent of the Ontario adults were edentulous in both jaws and 5.4 percent in one jaw (Table 193). At ages 35 to 44 years, 8.7 percent of adults were edentulous in both jaws and an additional 11.5 percent were edentulous only in one jaw.

Table 194 shows the percent of adults that are totally edentulous in each of the six study areas. It should be noted that over one-third of New Zealand's adults are totally edentulous while no edentulous respondents were in Japan's sample. Ontario's proportion of edentulous adults was between Norway's and the United States'. One aspect of the metropolitan/non- metropolitan subgrouping is that the latter had over twice as many edentulous adults. In Ontario, this can be partially explained by the high number of low DMF Italian immigrants in the metropolitan sample.

TABLE 188

MEANS OF SELECTED ORAL MORBIDITY MEASURES
FOR 35-44 YEAR OLD DENTATE ADULTS BY STUDY AREA

	<u>Study Areas</u>						
	Aust.	F.R.G.	Jap.	N.Z.	Nor.	U.S.A.	Canada (Ontario)
<u>Total Caries Experience (DMF)</u>							
Total	18.04	14.57	10.74	18.64	22.22	15.82	15.47
Metro Males	16.27	14.15	8.88	17.61	20.73	15.17	13.90
Non-Metro Males	16.38	12.75	7.59	17.15	21.72	15.91	16.58
Metro Females	19.33	15.88	12.34	19.95	22.51	15.31	15.04
Non-Metro Females	19.54	15.40	13.20	19.69	23.74	16.84	17.78
<u>Number of Decayed Teeth</u>							
Total	0.67	0.87	1.91	0.47	0.83	1.55	0.92
Metro Males	0.96	1.06	1.77	0.60	0.77	2.80	1.34
Non-Metro Males	0.67	1.02	1.81	0.72	1.03	0.64	1.08
Metro Females	0.57	0.64	1.66	0.27	0.50	2.11	0.72
Non-Metro Females	0.44	0.80	2.32	0.33	1.03	0.70	0.80
<u>Number of Missing Teeth Due to Caries</u>							
Total	8.27	4.52	2.42	6.77	7.04	6.02	6.00
Metro Males	6.44	4.10	1.97	6.16	5.40	6.40	5.21
Non-Metro Males	8.42	4.34	1.91	7.08	7.63	5.01	7.56
Metro Females	7.52	5.20	2.50	6.70	6.39	6.62	5.36
Non-Metro Females	11.67	4.42	3.10	7.31	8.63	5.83	7.06
<u>Number of Successfully Filled Teeth</u>							
Total	8.43	8.18	4.41	10.47	12.92	6.67	7.59
Metro Males	7.99	8.12	3.98	9.83	13.29	4.81	6.45
Non-Metro Males	6.61	6.57	2.56	8.71	11.52	8.33	6.97
Metro Females	10.47	9.05	5.94	11.86	14.38	5.35	7.87
Non-Metro Females	6.92	8.92	4.80	11.10	12.36	8.50	9.39
<u>Number of Filled Teeth Needing Further Care</u>							
Total	0.68	1.00	2.00	0.95	1.43	1.69	0.98
Metro Males	0.68	0.88	1.17	1.02	1.27	1.43	1.13
Non-Metro Males	0.67	0.82	1.32	0.66	1.54	2.05	0.97
Metro Females	0.76	0.99	2.24	1.12	1.21	1.31	1.10
Non-Metro Females	0.53	1.26	2.97	0.96	1.71	1.86	0.54

TABLE 189

MEANS AND SELECTED ORAL MORBIDITY MEASURES
FOR 35-44 YEAR OLD DENTATE ADULTS BY STUDY AREA

	<u>Study Areas</u>						
	Aust.	F.R.G.	Jap.	N.Z.	Nor.	U.S.A.	Canada (Ontario)
<u>Debris Index (DI)</u>							
Total	0.92	1.06	1.18	0.66	0.68	0.51	0.78
Metro Males	1.07	1.11	1.29	0.74	0.81	0.55	0.84
Non-Metro Males	1.01	1.10	1.28	0.78	0.78	0.55	0.71
Metro Females	0.78	1.01	1.06	0.57	0.51	0.51	0.72
Non-Metro Females	0.89	1.00	1.14	0.57	0.64	0.46	0.52
<u>Calculus Index (CI)</u>							
Total	0.22	0.67	1.01	0.18	0.51	0.64	0.85
Metro Males	0.25	0.74	1.13	0.24	0.55	0.95	0.98
Non-Metro Males	0.40	0.73	1.23	0.25	0.73	0.49	0.91
Metro Females	0.15	0.60	0.78	0.10	0.28	0.74	0.80
Non-Metro Females	0.14	0.62	0.93	0.12	0.52	0.42	0.71
<u>Oral Hygiene Index (OHI-S)</u>							
Total	1.13	1.71	2.16	0.82	1.20	1.16	1.44
Metro Males	1.34	1.83	2.38	0.93	1.37	1.51	1.69
Non-Metro Males	1.35	1.78	2.48	0.99	1.53	1.06	1.43
Metro Females	0.92	1.63	1.80	0.70	0.80	1.25	1.44
Non-Metro Females	1.02	1.61	2.03	0.68	1.16	0.88	1.04
<u>Periodontal Index (PI)</u>							
Total	1.48	2.02	2.15	1.08	1.30	2.10	0.96
Metro Males	1.71	2.16	2.17	1.19	1.38	2.62	1.20
Non-Metro Males	1.76	2.10	2.57	1.12	1.48	2.11	1.07
Metro Females	1.25	1.95	1.75	1.03	1.06	2.11	0.81
Non-Metro Females	1.36	1.91	2.16	0.96	1.32	1.66	0.78
<u>Periodontal Index Modified</u>							
Total	1.20	1.72	1.74	0.96	1.02	1.78	0.81
Metro Males	1.36	1.78	1.74	1.05	1.07	2.20	0.95
Non-Metro Males	1.32	1.79	1.98	1.02	1.15	1.78	0.89
Metro females	1.07	1.67	1.47	0.92	0.87	1.77	0.70
Non-Metro Females	1.12	1.66	1.79	0.85	1.02	1.47	0.71

TABLE 190

MEANS OF SELECTED ORAL MORBIDITY MEASURES
FOR 35-44 YEAR OLD DENTATE ADULTS BY STUDY AREA

	Aust.	F.R.G.	Jap.	N.Z.	Nor.	U.S.A.	Canada (Ontario)
<u>Number of Teeth with Gingivitis</u>							
Total	10.94	18.57	19.06	14.33	11.42	16.09	10.28
Metro Males	12.05	18.88	20.00	15.61	12.59	15.72	10.15
Non-Metro Males	10.82	18.88	18.52	15.11	11.60	16.73	10.90
Metro Females	11.18	17.85	19.71	13.59	11.33	16.26	9.87
Non-Metro Females	9.08	18.66	18.19	12.94	10.30	15.68	10.13
<u>Number of Teeth with Periodontitis</u>							
Total	1.97	2.28	3.78	0.98	1.98	2.60	1.12
Metro Males	2.74	2.97	3.47	1.07	2.41	4.02	1.87
Non-Metro Males	2.96	2.38	5.79	0.96	2.44	2.75	1.20
Metro Females	1.44	1.94	2.37	1.03	1.34	2.50	0.84
Non-Metro Females	1.05	1.94	3.72	0.80	1.82	1.52	0.36
<u>Number of Teeth Lost Due to Periodontal Disease</u>							
Total	0.10	0.10	0.32	0.06	0.04	0.15	0.11
Metro Males	0.11	0.13	0.49	0.16	0.09	0.00	0.18
Non-Metro Males	0.24	0.10	0.36	0.08	0.00	0.43	0.01
Metro Females	0.04	0.04	0.10	0.00	0.04	0.14	0.16
Non-Metro Females	0.07	0.12	0.37	0.00	0.03	0.08	0.01

TABLE 191

MEANS OF SELECTED ORAL MORBIDITY MEASURES
FOR 35-44 YEAR OLD DENTATE ADULTS BY STUDY AREA

	Aust.	F.R.G.	Jap.	N.Z.	Nor.	U.S.A.	Canada (Ontario)
	<u>Ratio of Successful Treatment to Total Need for Treatment</u>						
Total	0.83	0.79	0.52	0.88	0.80	0.64	0.58
Metro Males	0.79	0.78	0.55	0.85	0.82	0.51	0.53
Non-Metro Males	0.80	0.74	0.46	0.85	0.76	0.73	0.53
Metro Females	0.85	9.82	0.58	0.89	0.84	0.59	0.60
Non-Metro Females	0.87	0.80	0.48	0.93	0.77	0.74	0.68
	<u>Ratio of Needed Retreatment to Total Treatment Provided</u>						
Total	0.08	0.13	0.27	0.06	0.12	0.18	0.15
Metro Males	0.10	0.12	0.21	0.09	0.11	0.19	0.16
Non-Metro Males	0.08	0.14	0.27	0.05	0.14	0.21	0.19
Metro Females	0.08	0.11	0.25	0.07	0.10	0.15	0.13
Non-Metro Females	0.06	0.14	0.34	0.05	0.14	0.16	0.09
	<u>Combined Status Ratio</u>						
Total							
Metro Males	0.51	0.53	0.56	0.57	0.47	0.61	0.50
Non-Metro Males	0.50	0.54	0.54	0.55	0.45	0.66	0.47
Metro Females	0.48	0.52	0.54	0.54	0.43	0.57	0.54
Non-Metro Females	0.55	0.54	0.57	0.60	0.51	0.64	0.44

TABLE 192

PERCENT OF DMF, DECAYED MISSING AND
SUCCESSFULLY FILLED TEETH
FOR 35 - 44 YEAR OLD DENTATE ADULTS BY STUDY AREA

	% of DMF Decayed	% of DMF Missing	% of DMF Successfully Filled
Australia	3.7	45.8	46.7
Germany	6.0	31.0	56.1
Japan	17.8	22.5	44.1
New Zealand	2.5	35.9	65.2
Norway	3.7	31.7	58.1
U.S.A.	10.0	38.1	42.2
Canada	5.9	38.8	48.7

TABLE 193

ONTARIO, CANADA - ADULTS

Age	Edentulous Both Jaws		Edentulous One Jaw	
	Number	Percent	Number	Percent
25 - 34	13	2.9	24	5.4
35 - 44	61	8.7	81	11.5

TABLE 194

PERCENT OF PERSONS TOTALLY EDENTULOUS BY LOCATION AND SEX
FOR 35 - 44 YEAR OLDS BY STUDY AREA

	Aust.	F.R.G.	Jap.	N.Z.	Nor.	U.S.A.	Canada (Ontario)
Total	13.2	1.6	0.0	35.7	6.4	10.6	8.7
Metro Males	5.6	1.9	0.0	24.3	3.0	8.5	5.0
Non-Metro Males	21.7	0.4	0.0	33.5	7.1	11.4	12.0
Metro Females	5.6	2.5	0.0	29.8	2.3	13.1	5.1
Non-Metro Females	26.2	1.6	0.0	52.0	12.6	8.7	18.1

Prosthetic Requirements

Barmes (1976) presented prosthetic requirements for the I.C.S. country adults in the form of:

No requirement - have none need none

Required but need not met - have none need some

Need met satisfactorily - have some need none

Need met unsatisfactorily - have some need some

Requirements for full dentures, partial dentures and bridges are described in a similar fashion here.

Requirements for Full Dentures (Complete or one jaw only)

The requirements by 25-34 year old adults for full dentures in one or both jaws are described in Table 195. Most of the full denture wearers were found in the non-metropolitan areas. Ninety-three point seven percent of the sample had no need for a complete denture; 5.4 percent had satisfactory complete dentures; 0.5 percent needed but did not have a denture, and 0.5 percent had an unsatisfactory denture or needed another one.

The requirements by 35-44 year old adults for full dentures in one or both jaws are described in Table 196. A greater percentage of full denture wearers were found in non-metropolitan areas. Eighty-six point seven percent of the sample did not require or possess a full denture; 0.5 percent needed a full denture but did not have one; 10.3 percent wore a satisfactory full denture and 2.3 percent had an unsatisfactory full denture or needed an additional one.

Requirements for Partial Dentures

Partial denture requirements by 25-34 year old dentate adults are described in Table 197.

A higher percentage of non-metropolitan subjects needed a partial denture but did not have one than their metropolitan counterparts (22.2 vs. 16.1 percent) Seventy-four point seven percent of the total sample did not need or have a partial denture; 18.6 percent needed a partial denture but did not have one; 5.8 percent had a satisfactory partial denture and 0.9 percent had an unsatisfactory partial denture or needed a new one.

Requirements by 35-44 year old dentate adults are shown in Table 198. There was a very large unmet need for partial dentures by male, female, metropolitan and non-metropolitan subjects.

For the whole sample of 639 subjects, 58.1 percent had or needed a partial denture, 27.2 percent did not have but needed a partial denture, 9.2 percent had a satisfactory partial denture and 5.5 percent had an unsatisfactory partial or required an additional one.

Requirements for Bridges

Bridge requirements for 25-34 year old dentate adults as shown in Table 199 are characterized by a very high unmet need for bridges by members of both sexes and by metropolitan and non-metropolitan subjects.

For the total sample of 428, 60.7 percent did not have or need a bridge; 33.6 percent did not have, but needed a bridge; 2.1 percent had a satisfactory bridge and 0.5 percent had an unsatisfactory bridge or needed an additional one.

The bridge requirements of 35-44 year old dentate adults were similar to those of the younger adults (Table 200). Both sexes, metropolitan and non-metropolitan subjects had high unmet bridge needs. Of the total sample of 639, only 53.7 percent did not have or need a bridge; 35.5 percent did not have but did need a bridge; 6.7 percent had a satisfactory bridge and 3.9 percent had an unsatisfactory bridge or needed an additional one.

The unmet need for bridges was higher than that of any other nation in the I.C.S. group.

TABLE 195

FULL DENTURE REQUIREMENTS (ONE OR BOTH JAWS)

25 - 34 YEAR OLD ADULTS, ONTARIO

Metropolitan (N=293)	Males		Females		Males and Females	
	N	%	N	%	N	%
Have none need none	127	97.7	159	97.5	286	97.6
Have none need some	1	0.8	0	0.0	1	0.3
Have some need none	2	1.5	4	2.5	6	2.1
Have some need some	0	0.0	0	0.0	0	0.0
Total	130	100.0	163	100.0	293	100.0

Non-metropolitan (N=135)

Have none need none	54	85.7	61	84.7	115	85.2
Have none need some	1	1.6	0	0.0	1	0.7
Have some need none	7	11.1	10	13.9	17	12.6
Have some need some	1	1.6	1	1.4	2	1.5
Total	63	100.0	72	100.0	135	100.0

Total sample (N=428)

Have none need none	181	93.8	220	93.6	401	93.7
Have none need some	2	1.0	0	0.0	2	0.5
Have some need none	9	4.7	14	6.0	23	5.4
Have some need some	1	0.5	1	0.4	2	0.5
Total	193	100.0	235	100.0	428	100.1

TABLE 196

FULL DENTURE REQUIREMENTS (ONE OR BOTH JAWS)

35 - 44 YEAR OLD ADULTS, ONTARIO

Metropolitan (N=414)	Males		Females		Males and Females	
	N	%	N	%	N	%
Have none need none	174	91.1	200	89.7	374	90.3
Have none need some	1	0.5	0	0.0	1	0.2
Have some need none	14	7.3	19	8.5	33	8.0
Have some need some	2	1.0	4	1.8	6	1.5
Total	191	100.0	223	100.0	414	100.0
Non-metropolitan (N=225)						
Have none need none	81	77.9	100	82.0	181	80.1
Have none need some	2	1.9	0	0.0	2	0.9
Have some need none	15	14.4	18	14.8	33	14.6
Have some need some	6	5.8	4	3.3	10	4.4
Total	104	100.0	122	100.0	226	100.0
Total sample (N=639)						
Have none need none	255	86.4	300	87.0	555	86.7
Have none need some	3	1.0	0	0.0	3	0.5
Have some need none	29	9.8	37	10.7	66	10.3
Have some need some	8	2.7	8	2.3	16	2.5
Total	295	99.9	345	100.0	640	100.0

TABLE 197

PARTIAL DENTURE REQUIREMENTS

25 - 34 YEAR OLD DENTATE ADULTS, ONTARIO

Metropolitan (N=293)	Males		Females		Males and Females	
	N	%	N	%	N	%
Have none need none	109	83.8	140	85.9	149	77.2
Have none need some	17	13.1	14	8.6	31	16.1
Have some need none	4	3.1	8	4.9	12	6.2
Have some need some	0	0.0	1	0.6	1	0.5
Total	130	100.0	163	100.0	193	100.0
Non-metropolitan (N=135)						
Have none need none	43	68.3	53	73.6	96	71.1
Have none need some	12	19.0	18	25.0	30	22.2
Have some need none	6	9.5	1	1.4	7	5.2
Have some need some	2	3.2	0	0.0	2	1.5
Total	63	100.0	72	100.0	135	100.0
Total sample (N=428)						
Have none need none	152	78.8	193	82.1	245	74.7
Have none need some	29	15.0	32	13.6	61	18.6
Have some need none	10	5.2	9	3.8	19	5.8
Have some need some	2	1.0	1	0.4	3	0.9
Total	193	100.0	235	99.9	328	100.0

TABLE 198

PARTIAL DENTURE REQUIREMENTS

35 · 44 YEAR OLD DENTATE ADULTS, ONTARIO

Metropolitan (N=414)	Males		Females		Males and Females	
	N	%	N	%	N	%
Have none need none	114	59.7	134	60.1	248	59.9
Have none need some	44	23.0	58	26.0	102	24.6
Have some need none	20	10.5	19	8.5	39	9.4
Have some need some	13	6.8	12	5.3	25	6.1
Total	191	100.0	223	100.0	414	100.0
Non-metropolitan (N=225)						
Have none need none	57	55.3	66	54.1	123	54.7
Have none need some	34	33.0	38	31.1	72	32.0
Have some need none	7	6.8	13	10.7	20	8.9
Have some need some	5	4.9	5	4.1	10	4.4
Total	103	100.0	122	100.0	225	100.0
Total sample (N=639)						
Have none need none	171		200		371	58.1
Have none need some	78		96		174	27.2
Have some need none	27		32		59	9.2
Have some need some	18		17		35	5.5
Total	294		345		639	100.0

TABLE 199

BRIDGE REQUIREMENTS BY
25 - 34 YEAR OLD DENTATE ADULTS, ONTARIO

Metropolitan (N=293)	Males		Females		Males and Females	
	N	%	N	%	N	%
Have none need none	69	53.1	108	66.3	177	60.4
Have none need some	57	43.8	50	30.7	107	36.5
Have some need none	3	2.3	4	2.5	7	2.4
Have some need some	1	0.8	1	0.6	2	0.7
Total	130	100.0	163	100.0	293	100.0

Non-metropolitan (N=135)

Have none need none	41	65.1	42	58.3	83	61.5
Have none need some	21	33.3	29	40.3	50	37.0
Have some need none	1	1.6	1	1.4	2	1.5
Have some need some	0	0.0	0	0.0	0	0.0
Total	63	100.0	72	100.0	135	100.0

Total sample (N=428)

Have none need none	110	57.0	150	63.8	260	60.7
Have none need some	78	40.4	79	33.6	157	36.7
Have some need none	4	2.1	5	2.1	9	2.1
Have some need some	1	0.5	1	0.5	2	0.5
Total	193	100.0	235	100.0	428	100.0

TABLE 200

BRIDGE REQUIREMENTS BY
35 - 44 YEAR OLD DENTATE ADULTS, ONTARIO

Metropolitan (N=414)	Males		Females		Males and Females	
	N	%	N	%	N	%
Have none need none	99	51.8	117	52.5	216	52.2
Have none need some	74	38.7	76	34.1	150	36.2
Have some need none	13	6.8	19	8.5	32	7.7
Have some need some	5	2.6	11	4.9	16	3.9
Total	191	100.0	223	100.0	414	100.0
Non-metropolitan (N=225)						
Have none need none	55	53.4	72	59.0	127	56.5
Have none need some	36	35.0	41	33.6	77	34.2
Have some need none	6	5.8	6	4.9	12	5.3
Have some need some	6	5.8	3	2.5	9	4.0
Total	103	100.0	122	100.0	225	100.0
Total sample (N=639)						
Have none need none	154	52.4	189	54.8	343	53.7
Have none need some	110	37.4	117	33.9	227	35.5
Have some need none	19	6.5	25	7.2	44	6.9
Have some need some	11	3.7	14	4.1	25	3.9
Total	294	100.0	345	100.0	639	100.0

PART IV THE EFFECTS OF SOCIOLOGICAL FACTORS

ON ORAL HEALTH STATUS

CHAPTER ONE
THE STUDENT SAMPLE

Background

A further innovative aspect of the design of the International Collaborative Study was that in addition to clinical data, information was gathered about dental habits and dental attitudes. In this way the analytic possibilities were broadened in that it would be possible not only to determine the system effects on the individual, but also the relationship of individual differences in attitudes, values, and habits to oral health status. The purpose of this chapter is to review the effect of these sociological factors on the state of dental health of the 13 and 14 year olds. First, the characteristics of the sample will be reviewed.

Characteristics of Student Sample

As was mentioned in a previous chapter 47.1 percent of the sample is male and the rest female (52.9%). Most of the students are native born Canadians (89.5%) with the next largest group coming from the countries of Northern Europe (3.4%). Unfortunately, the questionnaire did not ask the birthplace of the student's parents which is a very

relevant variable considering the high number of immigrants in Ontario.

In terms of present residence, 70.2 percent of the student sample resides in metropolitan areas and the remainder resides in non-metropolitan areas (29.8%).

Fluoride status is another determining factor which should be discussed. Slightly more than 45 percent of the students were born and spent their formative years in a fluoride area, while 31.8 percent were born and raised in a non-fluoride area. For the rest of the sample either no information was available or they lived in both fluoride and non-fluoride areas during the designated time period (birth until 5 years old).

The next sections of the chapter will review the relationship of specific variables to selected measures of oral morbidity.

Socioeconomic Factors

Traditionally in the social sciences, socioeconomic status or social class has been viewed as a multidimensional variable. There are a variety of ways to operationalize this variable but the most usual is a combination of education, occupation and income. In classifying the students on this dimension, certain problems arise. First, according to these traditional indicators the students have no social class of their own. Rather, they derive theirs from the class of their parents. In addition, it is difficult to collect data on all three dimensions as many 13-14 year olds would not be privy to the financial status of the family; nor would they be certain of the exact occupational roles of their parents. For these reasons the only social class dimension used was education of parents. There are several research studies which indicate that the higher one's social class the more likely is one to utilize dental services (Kegeles, 1967).

Tables 201 and 202 show the means for various oral morbidity measures by parent's education. It should be noted that education of parents results in a significant difference¹ in visits to the dentist, DMF, number of decayed teeth, missing teeth, gingivitis, oral hygiene index, and periodontal index. The pattern of these differences seems to show that the higher the education of the parents the more visits the students make to the dentist. Students whose parents have more education also have a lower DMF and fewer

¹ Using analysis of variance

decayed teeth. This latter measure may also be related to number of visits, as decayed teeth are an indicator of unmet need and more visits to the dentist should result in a lower unmet need. In addition, those whose parents have a higher education have significantly fewer missing teeth. This lower number could be seen as an indicator of prompt dental attention, and conversely a higher number of missing teeth indicates delayed dental attention.

There are significant differences among the categories for gingivitis, oral hygiene and periodontal index but the pattern of these differences is not as well defined as for the caries measures. For example for gingivitis, the scores decrease as education increases except for the highest educational level where they increase by about one and a half teeth.

Another, but indirect, measure of social class might be size of family in that it would be a factor in determining amount of disposable income available. Tables 203 and 204 indicate that size of family is significantly¹ related to DMF, number of decayed teeth, number of missing teeth and number of visits to the dentist. It would appear that the fewer the children in a family, the more dental visits are made. These visits in turn may be related to the lower DMF, and number of decayed and missing teeth. For the oral hygiene indicators, a significant difference exists only for the oral hygiene index but the trends for the other measures are similar in that the more children in a family, the higher the score. Thus, size of family may also be related to time priorities. The fewer the children, the more available time the parents might have to teach oral hygiene techniques. Or again, the differences and patterns in the oral

1

Using analysis of variance

hygiene indicators may be related to visits to the dentist.

To summarize the relationship of measures of social class and oral health status, it would appear that in general the higher one's social class the higher one's utilization of dental services and the better one's overall oral health status.

TABLE 201

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
EDUCATION OF PARENTS FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Education of Parents	N	Visits to Dentist		DMF		Decayed Teeth		Successfully Filled Teeth		Missing Teeth	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	862	1.98	2.19	4.27	3.47	1.04	1.86	2.88	2.93	0.16	0.53
Neither completed high school	362	1.57	1.90	4.47	3.78	1.28	1.98	2.76	3.19	0.22	0.63
One completed high school	157	1.88	1.93	4.75	3.37	1.48	2.38	2.98	2.70	0.15	0.48
Both completed high school	129	2.21	2.34	3.95	3.19	0.81	1.48	2.72	2.68	0.13	0.44
One completed college	100	2.32	2.26	3.97	3.20	0.52	1.08	3.14	2.81	0.12	0.50
Both completed college	114	2.94	2.73	3.63	2.96	0.38	1.11	3.09	2.73	0.04	0.25

TABLE 202

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
EDUCATION OF PARENTS FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Education of Parents	N	Gingivitis		Oral Hygiene Index		Periodontal Index		Orthodontic Need	
		$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
Total	862	6.51	5.72	0.82	0.63	0.26	0.25	0.60	0.87
Neither completed high school	362	7.31	5.93	0.96	0.67	0.30	0.27	0.57	0.86
One completed high school	157	6.94	6.29	0.82	0.63	0.28	0.28	0.69	0.92
Both completed high school	129	5.42	5.01	0.73	0.61	0.22	0.21	0.53	0.84
One completed college	100	4.73	4.64	0.59	0.41	0.18	0.18	0.66	0.89
Both completed college	114	6.15	5.31	0.70	0.56	0.24	0.23	0.64	0.86

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
SIZE OF FAMILY FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Visits to Dentist		DMF		Decayed Teeth		Successfully Filled Teeth		Missing Teeth	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	936	1.98	2.18	4.32	3.54	1.01	1.82	2.96	3.06	0.15	0.52
Less than 3 children	256	2.10	2.14	3.61	3.01	0.64	1.24	2.76	2.84	0.05	0.29
3 or 4 children	455	2.07	2.28	4.46	3.69	0.97	1.62	3.13	3.19	0.18	0.58
More than 4 children	225	1.66	2.01	4.82	3.70	1.52	2.51	2.83	3.02	0.21	0.58

TABLE 204

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
SIZE OF FAMILY FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Oral Hygiene Index		Periodontal Index		Orthodontic Need	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	936	6.50	5.74	0.31	0.62	0.26	0.25	0.59	0.87
Less than 3 children	256	6.24	5.40	0.76	0.53	0.24	0.21	0.50	0.81
3 or 4 children	455	6.47	5.78	0.77	0.60	0.26	0.25	0.61	0.89
More than 4 children	225	6.86	6.05	0.95	0.72	0.28	0.29	0.64	0.89

Past General Health Actions

If preventive health behaviour is a general form of behaviour not specific by ailment, then one would expect the utilization patterns for types of health practitioners to be similar.

Tables 205 to 208 indicate the distribution of visits for physicians, nurses and dentists. The average number of visits to physicians is 2.89, to nurses 1.58, to physicians and nurses 3.21, and to dentists 1.98. Visits to dentists are positively correlated¹ with DMF and successfully filled teeth and negatively correlated with number of decayed teeth and oral hygiene scores. What this means is that the more one visits the dentist the higher one's DMF will be, but this higher value is accounted for by an increased number of successfully filled teeth as opposed to decayed or missing teeth. Likewise, the fewer visits one makes the more unmet need (i.e. decayed teeth) there is. The higher oral hygiene score for the low visiting group could be accounted for by fewer visits, meaning less oral hygiene instructions or fewer visits implying a lower priority for dental health in general which would include differences in toothbrushing frequency and technique.

In terms of the impact of past general health actions on oral health status, it would appear that the more one visits other health practitioners the more one visits the dentist, and the more one visits the dentist the better one's oral health status in that there is less unmet need.

¹ Using Pearson's correlation coefficient

TABLE 205

DISTRIBUTION BY NUMBER AND PERCENT OF VISITS TO
THE PHYSICIAN IN THE LAST 12 MONTHS FOR
13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

<u>No. of Visits</u>	<u>N</u>	<u>%</u>
None	120	12.8
1	193	20.6
2	227	24.3
3	123	13.1
4+	273	29.2
Total	936	100.0

TABLE 206

DISTRIBUTION BY NUMBER AND PERCENT OF VISITS TO THE NURSE
IN THE LAST 12 MONTHS FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

<u>No. of Visits</u>	<u>N</u>	<u>%</u>
None	361	38.6
1	249	26.6
2	148	15.8
3	56	6.0
4+	122	13.0
Total	936	100.0

TABLE 207

DISTRIBUTION BY NUMBER AND PERCENT OF VISITS TO
THE DENTIST IN THE LAST 12 MONTHS FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

<u>Number of Visits</u> ¹	<u>N</u>	<u>%</u>
None	243	26.0
1	215	23.0
2	253	27.0
3	90	9.6
4+	135	14.4
Total	936	100.0

¹ The next question asked the respondents exactly when the last visit to the dentist was made. The answers indicated that 70.9 percent had visited within the last year. The 3.1 percent difference in the visiting behaviour could be accounted for by a slight miscalculation of "12 months ago". For example, 5.1 percent of the sample had their last visit 13 months before.

TABLE 208

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES
BY NUMBER OF DENTAL VISITS IN PAST 12 MONTHS FOR
13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Decayed Teeth		Successfully Filled Teeth		Oral Hygiene Index	
	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	936	4.32	3.54	1.01	1.82	2.96	3.06	0.81	0.62
No visits	243	3.44	3.53	1.66	2.33	1.45	2.29	1.09	0.73
One visit	215	4.16	3.60	0.97	1.81	2.82	2.99	0.78	0.57
Two visits	253	4.67	3.14	0.67	1.54	3.71	2.79	0.64	0.49
Three or more visits	225	5.01	3.74	0.75	1.21	3.88	3.48	0.73	0.57

Perception of Dental Health

An important question for social scientists and indeed all those interested in the planning for health services is whether the consumer's perception of his state of health or health needs is congruent with the actual state of affairs. Tables 209 to 213 show the distribution of the sample on various measures of satisfaction. In terms of relating these perceptions to actual dental health, it was found that satisfaction with teeth was related to number of decayed teeth and orthodontic treatment required¹ in that those that were dissatisfied had a significantly poorer oral health status. Satisfaction with gums was significantly related to only the periodontal index, although the trends for the other oral hygiene measures were in the same direction; that is, the dissatisfied group had poorer scores than the satisfied group.

¹ Using student's t test

TABLE 209

DISTRIBUTION BY NUMBER AND PERCENT OF SATISFACTION WITH
TEETH FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

<u>Satisfaction Level</u>	<u>N</u>	<u>%</u>
Very dissatisfied	65	6.9
Somewhat dissatisfied	139	14.9
Somewhat satisfied	405	43.3
Very satisfied	320	34.2
Don't know	1	0.1
No answer	5	0.5
Total	936	100.0

TABLE 210

DISTRIBUTION BY NUMBER AND PERCENT OF SATISFACTION WITH
GUMS FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

<u>Satisfaction Level</u>	<u>N</u>	<u>%</u>
Very dissatisfied	33	3.5
Somewhat dissatisfied	57	6.1
Somewhat satisfied	363	38.8
Very satisfied	475	50.7
Don't know	2	0.2
No answer	6	0.6
Total	936	100.0

TABLE 211

DISTRIBUTION BY NUMBER AND PERCENT OF
OVERALL SATISFACTION WITH DENTAL HEALTH
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

<u>Satisfaction Level</u>	<u>N</u>	<u>%</u>
Satisfaction with teeth and gums	691	73.8
Satisfaction with teeth only	146	15.6
Satisfaction with gums only	33	3.5
Dissatisfaction with teeth and gums	57	6.1
No answer	9	1.0
Total	936	100.0

TABLE 212

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
SATISFACTION OF CONDITION OF TEETH
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Decayed Teeth		Successfully Filled Teeth		Missing Teeth		Orthodontic Treatment	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	929	4.52	3.55	1.02	1.82	2.97	3.06	0.15	0.52	0.59	0.87
Dissatisfied	204	4.74	3.95	1.79	2.65	2.64	3.04	0.14	0.49	0.87	0.95
Satisfied	725	4.21	3.43	0.80	1.44	3.06	3.07	0.16	0.52	0.51	0.83

TABLE 213

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
SATISFACTION WITH CONDITION OF GUMS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Oral Hygiene Index		Debris Index		Gingivitis		Periodontitis		Periodontal Index		
	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	928	0.81	0.61	0.68	0.46	6.49	5.72	0.01	0.09	0.26	0.25
Dissatisfied	90	0.90	0.67	0.75	0.52	7.82	6.63	0.00	0.00	0.33	0.33
Satisfied	838	0.80	0.61	0.67	0.45	6.34	5.60	0.01	0.09	0.25	0.24

Perception Of Dental Health Needs

If dental health is to be a priority then presumably an individual must be able to evaluate his/her needs if he/she is to be able to take appropriate actions.

Table 214 shows the distribution of the number of respondents experiencing particular dental conditions during the last 12 months. Bad breath seems to be the most common condition suffered. However, it must be remembered that the question did not differentiate between occasional bad breath and the more serious chronic bad breath.

Table 215 gives the reason for their last visit to the dentist. Forty percent of the respondents stated that they went for their regular check-up, whereas only 11 percent went for a toothache. When one looks at the relationship between perceived need on visiting the dentist and oral morbidity measures there are a few interesting relationships (Tables 216 and 217). For example there is a significant¹ difference in DMF among the perceived need categories. Those who see the need for some curative care have a higher DMF than those who do not. Their perception of the need for this care may be based on the fact that they have significantly more decayed and missing teeth. Those who perceive they have an orthodontic need also appear through the clinical examination to have significantly more need for this kind of treatment. Although there are significant differences on all the

¹ Using analysis of variance

oral hygiene measures, it is difficult to discern a pattern in that those who see a prophylactic need do not necessarily have the highest scores.

Another measure of perception is contained in Table 218. This table gives the student's perception of the comments that would be made if he/she visited the dentist. Most (53.6%) feel they would be told that they need to have their teeth cleaned. Sizeable proportions also feel they would be told about cavities (43.4%), fillings (41.8%) and toothbrushing (45.4%). Despite this, 44.7 percent feel they would be told that they have good dental health. In terms of the relationship between the perception of the dentist's comment regarding their dental health the oral morbidity measures, Tables 219 and 220, indicate that the students do have a realistic perception of their dental health. Those who perceive they have a good oral health status have a significantly lower DMF, fewer decayed teeth, fewer missing teeth, lower oral hygiene scores (OHI, gingivitis, periodontal index) and less orthodontic treatment required than does the group that perceives their dental health as not good.

A further indication of perception of dental health is whether the student saw a need for more dental treatment during the previous 12 months. As Tables 221 and 222 indicate, students appear to be able to accurately evaluate their own needs vis a vis their oral health status. Thus, one finds those who perceived that they needed more care have significantly fewer dental visits, more decayed teeth, fewer successfully filled teeth, a higher oral hygiene index, more gingivitis and a higher periodontal index.

TABLE 214

DISTRIBUTION BY NUMBER AND PERCENT OF
RESPONDENTS EXPERIENCING DENTAL CONDITIONS IN THE LAST 12 MONTHS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Dental Condition	Number Experiencing	% of Sample Experiencing
Swelling on inside of mouth	130	13.9
Broken tooth	114	12.2
Sore gum	199	21.3
Sore on inside of mouth	304	32.5
Bad breath	385	41.1
Bleeding gums	227	24.3
Toothache	326	34.8

TABLE 215

DISTRIBUTION BY NUMBER AND PERCENT OF
REASON FOR LAST VISIT TO DENTIST
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Reason	N	%
Teeth cleaned	219	23.4
Dentist called me in	222	23.7
Toothache	107	11.4
Broken tooth	53	5.7
Sore gums	14	1.5
Regular check up on own	379	40.5
Doctor told me to go	42	4.5
Cavities	242	25.9
Work on braces	83	8.9
School nurse told me to go	24	2.6
Check to see if teeth need to be straightened	75	8.0
Bleeding gums	12	1.3

TABLE 216

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
PERCEIVED NEED ON VISITING THE DENTIST FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Visits		Decayed Teeth		Successfully Filled Teeth		Missing Teeth	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	936	4.32	3.54	1.98	2.18	1.01	1.82	2.96	3.06	0.15	0.52
None	281	3.33	3.04	2.16	2.40	0.51	1.05	2.64	2.80	0.08	0.42
Curative only	109	5.38	4.14	2.06	2.20	1.24	2.06	3.66	3.60	0.27	0.64
Prophylaxis only	61	3.13	3.06	1.61	1.80	0.33	0.72	2.64	3.01	0.16	0.58
Curative and Proph.	269	5.54	3.82	1.73	1.91	1.61	2.31	3.39	3.28	0.21	0.61
Curative and Ortho.	31	4.23	3.06	2.06	2.21	1.55	2.05	2.29	2.27	0.19	0.48
Proph. and Ortho.	87	3.57	3.09	2.26	2.51	0.53	1.10	2.76	2.90	0.09	0.39
Cur. Proph. and Ortho.	98	4.03	2.84	1.99	2.09	1.27	2.00	2.50	2.61	0.13	0.42

TABLE 217

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
PERCEIVED NEED ON VISITING THE DENTIST FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Oral Hygiene		Gingivitis		Periodontal Index		Orthodontic Need	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	936	0.81	0.62	6.50	5.74	0.26	0.25	0.59	0.87
None	281	0.76	0.59	6.02	5.57	0.24	0.22	0.49	0.82
Curative only	109	0.65	0.52	5.72	5.59	0.23	0.24	0.47	0.81
Prophylaxis only	61	0.63	0.48	4.25	3.85	0.16	0.15	0.44	0.81
Curative and Proph.	269	0.97	0.69	7.56	6.13	0.30	0.26	0.51	0.84
Curative and Ortho.	31	0.75	0.51	6.65	5.61	0.29	0.27	1.29	0.90
Proph. and Ortho.	87	0.78	0.62	5.86	5.04	0.24	0.24	0.83	0.93
Cur. Proph. and Ortho.	98	0.87	0.61	7.26	6.32	0.31	0.33	0.88	0.91

TABLE 218

DISTRIBUTION BY NUMBER AND PERCENT OF DENTIST'S COMMENTS ON
RESPONDENTS TEETH FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	%
You have cavities	406	43.4
You need a tooth pulled	195	20.8
You need teeth cleaned	502	53.6
You need fillings	391	41.8
You need teeth straightened	226	24.1
You need to brush more often	425	45.4
You have good dental health	418	44.7

TABLE 219

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
PERCEPTION OF DENTIST'S COMMENT REGARDING DENTAL HEALTH
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Visits		Decayed Teeth		Successfully Filled Teeth		Missing Teeth	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	915	4.33	3.57	1.98	2.17	1.01	1.83	2.97	3.06	0.15	0.52
Good	418	3.77	3.31	2.08	2.18	0.56	1.23	2.96	2.96	0.12	0.46
Not good	497	4.79	3.71	1.89	2.16	1.40	2.14	2.97	3.15	0.18	0.56

TABLE 220

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
PERCEPTION OF DENTIST'S COMMENT REGARDING DENTAL HEALTH
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Oral Hygiene		Gingivitis		Periodontal Index		Orthodontic Need	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	915	0.81	0.61	6.48	5.72	0.26	0.25	0.59	0.87
Good	418	0.66	0.51	5.01	4.98	0.19	0.20	0.48	0.81
Not good	497	0.93	0.67	7.71	6.01	0.31	0.27	0.68	0.90

TABLE 221

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
PERCEPTION OF NEED FOR MORE DENTAL VISITS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Visits		Decayed Teeth		Successfully Filled Teeth		Missing Teeth	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	929	4.30	3.53	1.98	2.19	1.00	1.80	2.97	3.05	0.15	0.52
Yes	398	4.21	3.36	1.15	1.51	1.54	2.19	2.27	2.65	0.18	0.52
No	531	4.37	3.65	2.62	2.40	0.59	1.30	3.48	3.23	0.13	0.51

TABLE 222

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
PERCEPTION OF NEED FOR MORE DENTAL VISITS
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Oral Hygiene		Gingivitis		Periodontal Index		Orthodontic Need	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	929	0.81	0.61	6.47	5.75	0.26	0.25	0.59	0.87
Yes	398	0.97	0.68	7.54	6.06	0.30	0.27	0.58	0.86
No	531	0.68	0.53	5.67	5.37	0.23	0.23	0.59	0.87

Past Dental Health Actions

There are a number of activities an individual can engage in to reduce their rate of dental disease and to increase their chances of having healthy gums. The first is diet and this includes the reduction of the amount of sugar in daily food intake. In addition, dentists suggest lowering the number of between meal snacks because toothbrushing is more likely to become a habit if it is associated with specific meals and also because of the impact of sugar on teeth. Other activities which are classified as preventive actions include toothbrushing frequency, competence and other related oral hygiene actions (mouthwash, floss etc.).

Table 223 gives the distribution of the frequency of daily toothbrushing as reported by the students. Only 8.8 percent reported not brushing their teeth yesterday with the mean being 1.95 times per day. When related to oral morbidity measures, the number of times teeth are brushed is negatively related to the oral hygiene score, the number of decayed teeth, the number of teeth with gingivitis and the average periodontal score¹. The average number of snacks per day is 1.97. In terms of the relationship of snacks to oral morbidity measures, there are no significant correlations.

According to Table 224, after toothbrushing, the next most frequent dental habit is use of rinsing (35 percent) followed by the use of mouthwash (25 percent).

Another dental habit which may affect oral health status is the use of fluoride toothpaste. As can be seen by Table 225, the

¹ Using Pearson's Correlation Coefficient

majority of students (79.8%) use the fluoride toothpastes approved by the Canadian Dental Association.

Table 226 shows that the use of fluoride toothpaste appears to be related to a lower oral hygiene score, a lower number of teeth with gingivitis and a lower periodontal score. There were no significant findings with the caries measures possibly because of the compounding effect of fluoridated water, fluoride treatments and tablets.

To present dental habits more specifically, Table 227 shows the proportion of the sample brushing at specific times. The greatest percentage of students brushed their teeth after breakfast (63.6%) and before bedtime (57.8%). In the W.H.O. format for analysis they identified eleven types which covered the toothbrushing habits of the entire sample for all the countries in the I.C.S. However, when it was attempted to fit the Ontario sample into these types it was found that for almost half the sample there were no appropriate categories. What this means is that Ontario students report brushing their teeth at different times and combinations of times than do students in other countries.

TABLE 223

DISTRIBUTION BY NUMBER AND PERCENT OF
FREQUENCY OF DAILY TOOTHBRUSHING
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

<u>Frequency</u>	<u>N</u>	<u>%</u>
None	82	8.8
1	231	24.7
2	361	38.6
3	195	20.8
4+	67	7.2
Total	936	100.0

TABLE 224

DISTRIBUTION BY NUMBER AND PERCENT OF
ORAL HYGIENE HABITS FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Habit	N	%
Use of toothpick	139	14.9
Use of dental floss	124	13.2
Use of disclosing tablet	8	0.9
Use of mouthwash	235	25.1
Use of rinsing	323	34.5
Use of water spray	27	2.9
Use of plaque light	4	0.4

TABLE 225

DISTRIBUTION BY NUMBER AND PERCENT OF
USE OF FLUORIDE TOOTHPASTE
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Type of Toothpaste	N	%
Fluoride ¹	738	78.8
Non-fluoride	94	10.0
Don't know	16	1.7
Don't use	16	1.7
No. answer	72	7.7
Total	936	100.0

¹ For the purposes of coding "fluoride" was defined as those toothpastes approved by the Canadian Dental Association, i.e. Crest and Colgate. Other toothpastes claiming to have fluoride (e.g. Aim and Proof) were coded as non-fluoride. When respondents were asked if the toothpaste they used contained fluoride 83.4 percent answered affirmatively. Most of the discrepancy between 78.8 percent and 83.4 percent can be accounted for by the coding scheme.

TABLE 226

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
USE OF FLUORIDE TOOTHPASTE FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF			Oral Hygiene Index			Decayed Teeth			Gingivitis			Periodontal Index			Missing Teeth		
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	936	4.32	3.54	0.81	0.62	1.01	1.82	6.50	5.74	0.26	0.25	0.15	0.52						
Fluoride	738	4.36	3.55	0.75	0.56	0.95	1.74	6.14	5.57	0.25	0.24	0.15	0.51						
Non-Fluoride	198	4.16	3.51	1.05	0.74	1.24	2.08	7.86	6.17	0.32	0.27	0.18	0.57						

TABLE 227

DISTRIBUTION BY NUMBER AND PERCENT OF WHEN TEETH ARE BRUSHED
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

<u>When Brushed</u>	<u>N</u>	<u>%</u>
Before breakfast	268	28.6
After breakfast	594	63.5
After lunch	153	16.3
After dinner	324	34.6
Before bedtime	541	57.8

Availability of Dental Services

Attitudes toward the availability of dental services are important in the determination of a person's perception of oral health in their scheme of health priorities. Table 228 indicates that those who feel services are unavailable visit the dentist significantly fewer times than those who feel otherwise.¹ Likewise, they have significantly more decayed teeth and fewer successfully filled teeth. One does not know, however, if the fewer visits and higher unmet need are the result of a real deficiency in dental manpower or a different ordering of health priorities because of the perception of unavailability.

¹ Significance is determined using the Student's t test.

TABLE 228

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
PERCEIVED AVAILABILITY OF DENTISTS FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Visits		DMF		Decayed Teeth		Successfully Filled Teeth	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	903	2.01	2.19	4.32	3.55	0.99	1.80	2.98	3.04
Dentists are not available	159	1.63	1.78	4.21	3.66	1.24	1.98	2.55	2.76
Dentists are available	744	2.09	2.26	4.34	3.53	0.93	1.75	3.08	3.10

Accessibility to Dental Services

"Accessibility" has various components when one applies this concept to health services including economic accessibility; i.e., can one afford to pay for the dentist?, time; i.e., priorities, and waiting time; and distance, i.e., travel time, and proximity.

Economic Accessibility

Economic accessibility is not a simple variable to measure. First one might consider an objective evaluation; that is, all things being equal with \$X of disposable income would a family be able to afford dental services? This kind of measure fails to take account of families with different priorities for that disposable income. Thus, a more realistic measure of economic accessibility might be someone's perception of the affordability of these services. For the students, this becomes even more complex as they have limited information from which to form an opinion.

Only 10.1 percent of the students viewed dental services inaccessible for reasons of economic accessibility (Table 229). In terms of effect on selected oral morbidity measures (Table 230), the only significant¹ difference between these two groups is on the number of decayed teeth with those seeing services as inaccessible having 1.37 decayed teeth, and the other group 0.97.

¹ Significance is determined using the Student's t test

Table 231 takes a slightly different perspective on accessibility in that it refers to amount of disposable income. Less than 5 percent of the students viewed themselves as unable to use services for this reason. Table 232 presents the findings related to accessibility and oral morbidity measures. The inaccessible group has a significantly higher DMF and number of decayed teeth than those who perceive themselves as having economic access to dental services.

Time Accessibility

Time accessibility is complex in that one can measure it objectively; i.e., in minutes or hours or one can ask the respondent whether a specific length of time is too long. The second measure is probably better than the first in that it takes into account the relativity of waiting times in specific cultural settings. Unfortunately data were only collected on the first kind of measure.

Table 233 indicates that the mean waiting time in the dentist's office is less than 15 minutes. As shown in Table 234, there is a significant relationship between number of visits and total time¹ to see the dentist with the trend being for increased total time to result in decreased visits.

Another way of operationalizing the effect of time on accessibility is in terms of priorities. Table 235 is a composite of the variables presented in Tables 236 and 237. However, there are no significant differences between the two groups on any of the oral morbidity measures.

¹ This includes travel time to the dentist. The mean is 15.5 minutes, which means the average total time is about 30 minutes.

Distance Accessibility

This variable is closely related to time in that the further the distance to the dentist's office the more travel time required. Almost 83 percent of student visits to the dentist take place in offices. Twenty percent walk to the dentist and 56.2 percent are driven. Most (67.6%) leave from their home.

As mentioned previously, the mean travel time is about 15 minutes. Table 238 presents a more subjective evaluation of distance. However, as shown in Table 239, it is not significantly related to any of the oral morbidity measures.

TABLE 229

DISTRIBUTION BY NUMBER AND PERCENT OF
PERCEIVED ECONOMIC ACCESSIBILITY¹
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	%
Yes	95	10.1
No	826	88.2
DK	4	0.4
NA	11	1.2
Total	936	100.0

¹ Operationalized by agreement or disagreement with statement "My parents didn't want to spend money for a dentist unless they had to".

TABLE 230

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
PERCEIVED ECONOMIC ACCESSIBILITY
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Visits		DMF		Decayed Teeth		Successfully Filled Teeth	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	921	1.99	2.18	4.34	3.56	1.01	1.83	2.99	3.07
Inaccessible	95	1.68	2.03	4.68	4.01	1.37	2.32	2.95	2.77
Accessible	826	2.03	2.20	4.30	3.50	0.97	1.76	2.99	3.10

TABLE 231

DISTRIBUTION BY NUMBER AND PERCENT OF
PERCEIVED ECONOMIC ACCESSIBILITY¹
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	%
Yes	45	4.8
No	877	93.7
DK	2	0.2
NA	12	1.3
Total	936	100.0

¹ Operationalized by agreement or disagreement with statement "My parents could not afford money for a dentist".

TABLE 232

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
PERCEIVED ECONOMIC ACCESSIBILITY
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Visits		DMF		Decayed Teeth		Successfully Filled Teeth	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	922	1.99	2.18	4.33	3.55	1.00	1.80	2.99	3.07
Inaccessible	45	1.42	1.57	5.71	4.38	2.24	2.92	2.93	3.35
Accessible	877	2.01	2.20	4.26	3.49	0.94	1.70	2.99	3.05

TABLE 233

DISTRIBUTION BY NUMBER AND PERCENT OF WAITING TIME
TO VISIT THE DENTIST FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Time in Minutes	N	%
No wait	123	13.1
Less than 15	413	44.1
16 - 30	274	29.3
31 - 60	65	6.9
60+	8	0.9
DK	4	0.4
NA	49	5.2
Total	936	100.0

$\bar{X}$ = 14.3 minutes

TABLE 234

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
TOTAL TIME TO SEE THE DENTIST FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Visits		DMF		Decayed Teeth		Successfully Filled Teeth	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	830	1.98	2.18	4.32	3.54	1.01	1.82	2.96	3.06
15 min.	80	2.18	1.98	4.59	3.39	0.68	1.19	3.64	3.14
16 - 30	266	2.23	2.32	4.26	3.42	0.78	1.27	3.12	3.06
31 - 60	375	2.03	2.17	4.50	3.75	1.06	2.08	3.09	3.04
60+	82	1.85	1.80	4.11	2.99	0.88	1.38	2.82	2.76

TABLE 235

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
PERCEIVED TIME ACCESSIBILITY
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Visits		DMF		Decayed Teeth		Successfully Filled Teeth	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	856	2.03	2.18	4.30	3.51	0.97	1.79	2.98	3.00
Inaccessible	65	2.02	2.10	4.28	3.36	1.03	1.71	2.82	2.99
Accessible	791	2.03	2.20	4.30	3.52	0.96	1.79	2.99	3.00

TABLE 236

DISTRIBUTION BY NUMBER AND PERCENT OF
PERCEIVED TIME ACCESSIBILITY¹
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	%
Yes	101	10.8
No	820	87.6
DK	3	0.3
NA	12	1.3
Total	936	100.0

¹ Operationalized by agreement or disagreement with statement "I was too busy to see a dentist or I didn't have time to visit a dentist".

TABLE 237
DISTRIBUTION BY NUMBER AND PERCENT OF
PERCEIVED TIME ACCESSIBILITY¹
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	%
Yes	65	6.9
No	857	91.6
DK	3	0.3
NA	11	1.2
Total	936	100.0

¹ Operationalized by agreement or disagreement with the statement "I would have had to miss school, so I didn't want to go".

TABLE 238

DISTRIBUTION BY NUMBER AND PERCENT OF
PERCEIVED SPATIAL ACCESSIBILITY¹
FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	%
Yes	25	2.7
No	898	95.9
DK	2	0.2
NA	11	1.2
Total	936	100.0

¹ Operationalized by agreement or disagreement with statement "The dentist's office was too far away, so I didn't want to go".

TABLE 239

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
PERCEIVED SPATIAL ACCESSIBILITY FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Visits		DMF		Decayed Teeth		Successfully Filled Teeth	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	923	1.99	2.18	4.32	3.54	1.00	1.80	2.97	3.05
Inaccessible	25	1.52	2.18	3.84	3.79	1.36	2.40	2.28	2.28
Accessible	898	2.01	2.18	4.33	3.53	0.99	1.78	2.99	3.07

Acceptability

Acceptability of dental services to the consumer is a multi-dimensional concept and includes attitudes towards dentists, the importance of prevention, the role of aesthetics in formulating priorities and the expectation of discomfort.

Attitudes Toward Dentists

In asking students about their attitudes toward dentists several perspectives were covered including the dentist-patient relationship, the sensitivity of the dentist, the competence of the dentist and the status of the dentist relative to other occupations.

Five items operationalized the respondent's attitude toward the dentist-patient relationship including whether they found dentists friendly, helpful and pleasant. An average of 88.3 percent of the students saw the dentist-patient relationship positively. In terms of sensitivity of the dentist, three items including what the dentist tells the respondent, and how the dentist feels about pain were used for this concept. Again, the majority of respondents saw the dentist in a favourable light (77.7%). The final item was the competence of dentists. Two items were used for this variable: the perception of how much dentists know and an evaluation of how much they do. Almost 80 percent of students viewed the dentist favourably on this variable. When one investigates the relationship of attitudes toward dentists on these three dimensions and the oral morbidity measures, it appears that the attitudes of the students are not significantly related to many of these measures. There is a significant difference in the mean number of dental visits between

those who feel dentists are friendly and unfriendly, those who feel dentists remember you and don't, those who feel dentists tell you what they do and those who don't, and those who feel dentists don't care about pain and those who do. The problem with interpreting such findings are in determining the cause and the effect. Are the respondent's attitudes a product of their experience with dentists or did they learn the attitudes somewhere else and translate them into action (or inaction as the case might be)?

A further measure of the attitudes toward dentists is the relative status ranking of dentists compared to other occupations. The students ranked the dentist as follows: lawyer, physician, police officer, dentist, firefighter, nurse, teacher, dental assistant. Although the dentist ranks relatively high, as an occupation it has less status than a physician or police officer. When using status rankings as an indicator with an age group like 13-14 year olds it must be remembered that they base their judgments on different criteria than education, income and the other prestige indicators intended by those designing the scale.

Preventive Orientation

According to the Health Belief Model of Becker and Maiman (1975) in order for preventive behaviour to take place several conditions must be necessary. First, the person must perceive that he/she is susceptible, potentially serious, and that the action taken will result in some benefit.

For students this concept was operationalized by agreement with a number of preventively oriented statements. For example, Table 240 gives the distribution of responses to one preventive item. "Keeping one's teeth" and "avoiding toothaches" were considered to be preventively oriented statements and as can be seen 89.6 percent of the students chose one of these items. When one investigates the relationship of preventive orientation and selected oral morbidity measures (Tables 241 and 242) there are significant differences in number of visits, oral hygiene and gingivitis. For the other measures there is a trend for the more preventively oriented to have a better oral health status on each indicator. However, this pattern for other measures to be related to preventive orientation is probably because of the effect of differences in the number of visits.

Role of Aesthetics

Another perspective on the acceptability of dental services is the importance of aesthetics as a reason for using dental services. Table 243 gives the distribution of respondents on aesthetics. It would appear that for most students the appearance of teeth is an important value.

However, when one looks at the relationship between attitudes about aesthetics and some of the oral morbidity measures there are no significant associations.¹

Anticipated Pain

The final item which was thought to be a factor in determining the

¹ Using Pearson's Correlation Coefficient.

acceptability of services is the anticipated discomfort associated with dental services. Tables 244 and 245 indicate that there is a relationship between this perception and certain oral morbidity measures. The DMF scores and number of decayed teeth are significantly different with those with an anticipation of more pain having a higher value. The high pain group also has significantly fewer visits to the dentist. When one looks at the trends for DMF and visits it is hard to determine whether the high pain group has a higher DMF because they have had more work done and thus may have had more occasions to experience discomfort or whether their higher DMF is the result of delaying treatment because of their desire to avoid pain. Because the high pain group has more decayed teeth it would appear that there is more evidence for the second explanation but because of the inadequacy of the data the first cannot be dismissed.

TABLE 240

DISTRIBUTION BY NUMBER AND PERCENT OF BEST REASON FOR
GOING TO THE DENTIST FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

Reason	N	%
Keep teeth	783	83.7
Avoid crooked teeth	29	3.1
Avoid toothaches	55	5.9
Avoid dirty teeth	47	5.0
Don't know	14	1.5
Not applicable	8	0.9
Total	936	100.0

TABLE 241

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
PREVENTIVE ORIENTATION FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Visits		Decayed Teeth		Successfully Filled Teeth		Missing Teeth	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	936	4.32	3.54	1.98	2.18	1.01	1.82	2.96	3.06	0.15	0.52
Low	677	4.39	3.55	1.81	2.08	1.07	1.81	2.94	3.06	0.17	0.56
Med.	259	4.11	3.53	2.42	2.37	0.87	1.83	3.01	3.06	0.11	0.41

TABLE 242

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
PREVENTIVE ORIENTATION FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Oral Hygiene		Gingivitis		Periodontal Index		Ortho. Need	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	936	0.81	0.62	6.50	5.74	0.26	0.25	0.59	0.87
Low	677	0.85	0.63	6.75	5.75	0.27	0.25	0.60	0.88
Med.	259	0.72	0.58	5.85	5.67	0.24	0.25	0.55	0.84

TABLE 243

DISTRIBUTION BY NUMBER AND PERCENT OF THE
IMPORTANCE OF AESTHETICS¹ FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	%
Low	138	14.7
Med.-Low	82	8.8
Medium	238	25.4
Med.-High	262	28.0
High	216	23.1
Total	936	100.0

¹ Operationalized by agreement or disagreement with:

"Nice looking teeth are important for making friends"

"Children like adults better if they have nice looking teeth"

"Boys like girls better if they have nice looking teeth" and

"Girls like boys better if they have nice looking teeth".

TABLE 244

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
 ANTICIPATED LEVEL OF PAIN ON VISITING THE DENTIST FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Visits		Decayed Teeth		Successfully Filled Teeth		Missing Teeth	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	820	4.42	3.52	2.05	2.14	0.90	1.71	3.17	3.06	0.16	0.52
None	293	3.75	3.30	2.06	2.16	0.54	0.98	2.99	3.05	0.09	0.44
Low level	401	4.68	3.71	2.22	2.27	1.05	2.01	3.24	3.09	0.17	0.53
Med. level	78	5.19	3.17	1.69	1.63	1.12	1.50	3.51	2.94	0.35	0.72
High level	48	5.08	3.07	1.23	1.15	1.52	2.26	3.21	3.08	0.13	0.33

TABLE 245

MEANS AND STANDARD DEVIATIONS FOR SELECTED ORAL MORBIDITY MEASURES BY
ANTICIPATED LEVEL OF PAIN ON VISITING THE DENTIST FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

	Oral Hygiene			Gingivitis			Periodontal Index			Ortho. Need		
	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	SD
Total	820	0.77	0.57	6.30	5.60	0.25	0.25	0.59	0.87			
None	293	0.70	0.54	5.88	5.63	0.24	0.24	0.52	0.84			
Low level	401	0.79	0.58	6.50	5.59	0.26	0.25	0.60	0.88			
Med. level	78	0.77	0.57	6.17	5.61	0.24	0.21	0.81	0.93			
High level	48	0.98	0.65	7.46	5.50	0.32	0.30	0.63	0.87			

Utilization

Besides wanting to know the number of dental visits, it would be important to know which services are usually rendered at a visit. As might be expected (Table 246) examinations, cleaning, fillings, X-rays, and fluoride treatments are the most common activities.

TABLE 246

DISTRIBUTION BY NUMBER AND PERCENT OF
WHAT WAS DONE ON LAST VISIT FOR 13-14 YEAR OLDS, ONTARIO SAMPLE, 1977

<u>Procedure</u>	<u>N</u>	<u>%</u>
Tooth pulled	110	11.8
Teeth cleaned	390	41.7
Tooth filled	331	35.4
Teeth examined	549	58.7
Gum work	17	1.8
X-rays	327	34.9
Broken tooth fixed	32	3.4
Braces adjusted	72	7.7
Examined for straightening	91	9.7
Fluoride treatment	291	31.1

Summary

The most important findings from the analysis of the relationship of sociological factors to oral health status are summarized below:

- 1) Social class is strongly related to both dental behaviour and oral health status. The higher a student's social class, the more likely are DMF and other caries measures to be low and the more dental visits are likely to be made.
- 2) The number of visits to other health practitioners is positively related to the number of visits to dentists.
- 3) The students' perception of their dental health is strongly related to their actual oral health status.
- 4) Perceived need for treatment is an accurate reflection of actual needs.
- 5) Toothbrushing habits are a more important determinant of oral health status than are number of snacks.
- 6) Perceived availability of dental services appears to be related to dental visits. However, it is difficult to discern from the data whether the perception caused the behaviour or vice versa.
- 7) Using anticipated pain as a measure of acceptability indicated that the more pain anticipated the fewer the dental visits and the higher the DMF.

CHAPTER TWO

THE ADULT SAMPLE

Introduction

In addition to information about the oral health status of adults, data were also gathered concerning dental habits and dental attitudes. In this way it may be possible to link sociological and demographic variables with dental behaviour and oral health status. Two groups of adults were sampled: 25-34 year olds and 35-44 year olds. Data will be presented for each group separately.

Description of the Sample

More females than males completed the survey in both age groups. Among the 441 25-34 year olds, 45.4 percent were males and 54.6 percent were females. The total number of respondents in the older age group was 702 with 45.9 percent being male and the rest (54.1%) female.

The average for the 25-34 year olds was 29.6 years and for the 35-44 year olds it was 39.4 years. Seventy-two point three percent of the 25-34 year olds and 89.6 percent of the 35-44 year olds were married.

One variable presumed to have an impact on oral health status is the length of time people are exposed to the dental system. Canada, more so than any of the other countries in the International Collaborative Study has a high proportion of immigrants. Only about 69 percent in each age group has lived in Canada for twenty years or more. This factor must be considered when examining oral health status in

relation to the dental health system. What one may be looking at is the impact of another country's dental system and ethnic origin on dental health.

Socioeconomic status is usually measured using some combination of education, occupation and income. For this project education and occupation were collected for the respondent and their partner (male or female). For male partner, according to Table 247 it would appear that 25-34 year olds have a higher educational level than the 35-44 year olds. For example, 31.3 percent of the younger group have at least a college education whereas only 20.2 percent of the older group falls into this category. For females the same pattern holds (Table 248) in that 26.1 percent of the younger age group and 15.7 percent of the older age group have at least a college education.

Another difference between these two age groups is that 44.4 percent of the 35-44 year olds classify themselves as housewives whereas only 28.8 percent of the 25-34 year olds are in the homemaker category. This, of course has implications for income. The average family income in the 25-34 year old group is \$18,025.70¹ and in the 35-44 year old group it is \$16,097.20¹. Income alone may not be enough to determine economic accessibility. Thus, respondents were asked about the number of people in their household. For the younger age group the average household size was 2.3; for the older group it was 4.0. This would mean that the 25-34 year old group had an average of

¹Using weighted average of midpoints of the income intervals.

TABLE 247

DISTRIBUTION BY NUMBER AND PERCENT OF
HIGHEST LEVEL OF EDUCATION ATTAINED BY
MALE RESPONDENT OR MALE PARTNER BY AGE
FOR ALL ADULTS, ONTARIO SAMPLE, 1977

Educational Level	25 - 34 Year Olds		35 - 44 Year Olds	
	N	%	N	%
Elementary	58	13.2	176	25.1
High School	146	33.1	300	42.7
Business or Technical	29	6.6	38	5.4
College or University	109	24.7	104	14.8
Post-University	29	6.6	38	5.4
Other	5	1.1	14	2.0
DK	2	0.5	2	0.3
NA	63	14.3	30	4.3
Total	441	100.0	702	100.0

TABLE 248

DISTRIBUTION BY NUMBER AND PERCENT OF
HIGHEST LEVEL OF EDUCATION ATTAINED BY
FEMALE RESPONDENT OR FEMALE PARTNER BY AGE
FOR ALL ADULTS, ONTARIO SAMPLE, 1977

Educational Level	25 - 34 Year Olds		35 - 44 Year Olds	
	N	%	N	%
Elementary	48	10.9	148	21.1
High School	195	44.2	336	47.9
Business or Technical	22	5.0	46	6.6
College or University	103	23.4	96	13.7
Post-University	12	2.7	14	2.0
Other	10	2.3	28	4.0
DK	2	0.5	1	0.1
NA	49	11.1	33	4.7
Total	441	100.0	702	100.0

\$7,827.36 available per person, while the older age group has \$4,024.30 available per person. Unfortunately, the crude measure does not take into account different life cycle demands on that disposable income (i.e. mortgage, furniture, appliances, etc.).

Sociodemographic Factors

The sociodemographic factors which will be investigated include social class, income and length of time in Canada. Because age may also be an important determinant in oral health status and practices, the data are presented for both 25 to 34 year olds and 35 to 44 year olds.

Social class is a multi - dimensional variable and the traditional indicators used to measure it include some combination of education, occupation and income. For this study Hollingshead and Redlich's two factor scale was used. Since such a high proportion of the females classify themselves as housewives, and thus could not be categorized and since traditionally females have derived their social class from that of their male partner, the social class of the male partner was used where appropriate.

As Tables 249, 250 indicate for the 25 to 34 year olds significant differences exist in DMF, the number of decayed teeth, the number of successfully filled teeth, and the number of missing teeth. In general, the trend is for the higher social class groups to have a better oral health status on these oral morbidity measures.

The same trend is evident in the older age group (Tables 251 and 252) with the addition that the higher social classes also have significantly fewer teeth with gingivitis, periodontitis and teeth in

TABLE 249

MEANS AND STANDARD DEVIATIONS FOR
 SELECTED ORAL MORBIDITY MEASURES BY SOCIO-ECONOMIC STATUS
 FOR 25-35 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Decayed Teeth		Successfully Filled Teeth		Missing Due To Caries	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	428	13.37	6.20	0.97	1.98	8.24	5.77	3.35	4.98
High	35	12.74	6.24	0.43	0.81	10.23	5.71	1.23	2.21
Medium high	65	13.40	5.63	0.66	2.12	10.42	4.87	1.20	2.19
Medium	109	13.52	5.88	0.82	1.55	8.53	5.63	3.23	5.09
Medium low	130	14.41	6.48	1.02	2.24	7.97	6.00	4.79	5.94
Low	69	11.46	6.32	1.70	2.15	5.20	5.09	3.91	4.72

TABLE 250

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY SOCIO-ECONOMIC STATUS
FOR 25-34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	428	10.80	7.35	0.46	1.76	1.84	2.54	1.79	3.34	2.59	1.14
High	35	12.34	7.74	0.54	1.82	1.31	1.89	1.66	1.55	2.34	1.03
Medium high	65	9.08	7.08	0.06	0.50	1.78	3.23	2.20	3.93	2.72	0.96
Medium	109	9.91	6.83	0.24	0.84	1.79	2.33	2.15	4.96	2.72	1.09
Medium low	130	10.58	7.23	0.70	2.25	1.72	2.34	1.60	2.02	2.46	1.21
Low	69	13.46	7.73	0.71	2.33	2.46	2.69	1.26	1.88	2.59	1.25

TABLE 251

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY SOCIO-ECONOMIC STATUS
FOR 35-44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Decayed Teeth		Successfully Filled Teeth		Missing Due To Caries	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	634	15.34	6.64	0.91	1.75	7.66	6.13	5.84	6.25
High	46	15.80	6.61	0.28	0.58	11.85	5.71	2.96	3.92
Medium high	66	16.94	5.57	0.53	1.22	12.20	5.67	2.74	3.92
Medium	128	16.12	5.83	0.62	1.44	10.23	5.53	5.27	5.70
Medium low	236	16.00	6.47	0.98	1.93	6.79	5.82	7.17	7.06
Low	158	13.11	7.42	1.38	1.98	4.58	5.20	6.45	6.00

TABLE 252

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY SOCIO-ECONOMIC STATUS
FOR 35-44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	634	10.32	6.97	1.13	3.03	1.97	2.46	1.69	2.51	2.64	1.17
High	46	7.74	6.11	0.39	1.08	1.02	1.82	2.09	1.49	3.02	1.13
Medium high	66	9.18	6.54	0.64	1.68	2.03	2.54	2.12	2.71	2.73	1.03
Medium	128	0.73	6.75	0.57	1.93	1.70	2.33	1.72	2.03	2.69	1.27
Medium low	236	10.44	7.01	1.31	3.22	2.14	2.64	1.47	1.80	2.57	1.14
Low	158	11.85	7.20	1.73	4.00	2.18	2.34	1.70	3.65	2.55	1.20

5 cases missing

need of treatment.

When investigating the factors affecting use of dental services, economic accessibility is usually felt to be an important determinant. Tables 253 through 256 present the findings for family income and its relationship to oral morbidity measures. For both age groups the higher the income the fewer decayed teeth and the higher the number of successfully filled teeth. None of the other measures were significantly affected.

Another important sociodemographic factor that is particularly relevant when discussing Canada is the length of time the respondent has been exposed to the dental service system in this country. Because there are so many recent immigrants to Canada more particularly to Toronto, the oral health status of a number of respondents may be a reflection of the dental system in Italy, Portugal or Greece rather than Canada. Tables 257 through 260 present the findings for both age groups. Although the longer one has been in Canada, the higher one's DMF, a longer length of residence also seems to result in significantly fewer decayed teeth, and more successfully filled teeth. This may be explained by the fact that Italians make up a significant proportion of the recent immigrants and as a group they have a much lower average DMF than other groups.

As for oral hygiene indicators in the 25-34 age group, those with longer residence in Canada had less periodontitis. For the 35-44 year olds longer residence results in less periodontitis as well as less gingivitis. This may be a reflection of differing cultural values surrounding toothbrushing and other dental practices.

TABLE 253

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY TOTAL FAMILY INCOME
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due To Caries	$\bar{X}$	SD
Total	416	13.52	6.14	0.97	1.98	8.30	5.71	3.38	5.04							
Under \$5,000	19	14.68	5.25	0.42	1.02	9.37	5.84	3.84	5.34							
\$5,000 - \$9,999	36	10.69	6.53	1.97	2.42	5.14	5.42	2.92	4.49							
\$10,000 - \$14,999	99	13.17	6.45	1.18	2.38	7.86	6.07	3.36	4.80							
\$15,000 - \$19,999	112	13.68	5.79	0.93	1.70	8.57	5.68	3.43	4.97							
\$20,000 - \$24,999	66	14.30	6.02	0.83	2.06	8.71	5.30	3.70	5.70							
\$25,000 - \$29,999	41	14.12	6.37	0.63	1.64	9.07	5.52	3.37	4.76							
\$30,000 and over	43	14.02	5.91	0.56	1.47	9.42	5.29	3.05	5.53							

12 cases missing

TABLE 254

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY TOTAL FAMILY INCOME
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	146	10.80	7.31	0.45	1.72	1.89	2.61	1.80	3.32	2.55	1.13
Under \$5,000	19	10.16	5.41	0.68	1.25	1.47	1.93	1.00	1.20	2.53	1.35
\$5,000 - \$9,999	36	11.83	8.08	0.86	3.02	2.89	3.48	1.44	1.93	2.72	1.11
\$10,000 - \$14,999	99	10.86	7.61	0.55	2.34	2.04	2.54	1.57	2.11	2.52	1.15
\$15,000 - \$19,999	112	11.12	7.06	0.28	1.05	1.70	2.10	2.10	4.86	2.50	1.16
\$20,000 - \$24,999	66	10.64	8.01	0.27	0.90	1.89	2.93	1.39	1.68	2.30	1.07
\$25,000 - \$29,999	41	10.73	6.40	0.56	1.55	1.71	2.47	2.78	5.01	2.90	1.18
\$30,000 and over	43	9.58	7.25	0.37	1.22	1.58	2.93	1.86	1.49	2.70	0.91

12 Cases missing

TABLE 255

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY TOTAL FAMILY INCOME
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Decayed Teeth		Successfully Filled Teeth		Missing Due To Caries	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	616	15.46	6.59	0.94	1.74	7.57	5.97	5.97	6.26
Under \$5,000	6	18.33	5.54	3.17	3.19	2.67	3.78	12.00	8.25
\$5,000 - \$9,999	46	14.00	7.14	1.76	2.25	4.30	5.04	7.24	6.83
\$10,000 - \$14,999	129	14.83	7.22	1.04	1.94	6.26	5.67	6.54	6.65
\$15,000 - \$19,999	163	14.79	6.75	1.07	1.90	6.54	5.70	6.29	6.34
\$20,000 - \$24,999	116	16.30	6.39	0.76	1.60	8.55	6.27	5.86	6.48
\$25,000 - \$29,999	83	16.00	6.24	0.63	1.20	8.77	5.99	5.65	6.06
\$30,000 and over	73	16.86	5.39	0.40	1.09	11.73	5.71	3.51	4.41

23 cases missing

TABLE 256

MEANS AND STANDARD DEVIATIONS FOR
 SELECTED ORAL MORBIDITY MEASURES BY TOTAL FAMILY INCOME
 FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	616	10.29	6.93	1.14	3.05	2.00	2.47	1.69	2.54	2.61	1.16
Under \$5,000	6	12.00	8.20	0.67	0.82	2.83	2.93	0.17	0.41	2.00	0.89
\$5,000 - \$9,999	46	10.80	7.37	1.24	2.98	2.50	2.49	1.63	2.24	2.74	1.22
\$10,000 - \$14,999	29	11.48	7.40	1.38	2.68	2.12	2.57	1.48	2.17	2.47	1.17
\$15,000 - \$19,999	163	10.52	6.69	1.55	3.57	2.06	2.52	1.67	3.41	2.56	1.08
\$20,000 - \$24,999	116	9.93	6.70	1.10	2.93	2.00	2.58	1.68	2.05	2.63	1.22
\$25,000 - \$29,999	83	9.06	6.71	0.78	2.33	1.61	2.11	1.90	2.55	2.63	1.11
\$30,000 and over	73	9.15	6.79	0.29	0.74	1.67	2.34	2.04	1.69	2.88	1.25

23 Cases missing

TABLE 257

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY LENGTH OF TIME IN CANADA
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	DMF	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Total	428	13.43	6.17		0.95	1.96		8.28	5.74		3.34	4.98			
Less than 5 years	38	11.05	6.56		1.61	1.98		5.71	5.60		2.97	4.43			
5 - 9 Years	51	10.04	5.30		1.39	1.94		5.04	4.76		2.98	3.30			
10 - 19 Years	49	10.41	6.52		0.67	1.25		5.24	4.02		2.80	5.22			
20 or more years	290	14.84	5.70		0.84	2.04		9.70	5.63		3.37	5.27			

TABLE 258

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY LENGTH OF TIME IN CANADA
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	428	10.84	7.31	0.46	1.73	1.86	2.59	1.78	3.29	2.58	1.13
Less than 5 years	38	11.37	6.81	0.97	3.11	2.53	2.57	1.37	1.81	3.11	1.18
5 - 9 Years	51	12.51	7.67	0.75	1.62	2.18	2.16	0.84	1.12	2.67	1.05
10 - 19 Years	49	11.41	8.35	1.04	3.25	1.49	2.03	1.65	2.34	2.55	1.19
20 or more Years	290	10.38	7.10	0.24	0.90	1.78	2.74	2.02	3.77	2.50	1.12

TABLE 259

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY LENGTH OF TIME IN CANADA
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF	X	SD	X	SD	Decayed Teeth	X	SD	Successfully Filled Teeth	X	SD	Missing Due to Caries	X	SD
Total	639	15.44	6.64	0.92	1.76	7.61	6.13	5.93	6.32						
Less than 5 years	27	12.30	6.95	1.56	2.44	6.26	5.74	3.81	4.74						
5 - 9 years	43	12.74	6.91	1.51	1.86	4.30	4.47	6.07	5.36						
10 - 19 years	132	11.95	7.30	1.06	1.87	5.39	5.41	4.55	4.72						
20 or more years	437	16.95	5.81	0.78	1.65	8.70	6.21	6.46	6.82						

TABLE 260
MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY LENGTH OF TIME IN CANADA
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	639	10.31	6.95	1.12	3.02	1.97	2.46	1.69	2.51	2.63	1.17
Less than 5 years	27	14.74	7.37	1.89	5.41	2.30	2.63	1.59	1.82	2.48	0.85
5 - 9 years	43	9.23	7.58	1.42	2.63	2.42	2.31	1.49	2.21	2.77	1.09
10 - 19 years	132	12.70	7.06	1.62	4.02	2.15	2.53	2.20	3.91	2.82	1.22
20 or more years	437	9.42	6.56	0.89	2.42	1.85	2.44	1.57	1.97	2.57	1.17

Perception of Health

In order to evaluate whether one should seek assistance for a health care problem, an individual must do some kind of self-evaluation of the state of his health. The difficulty with this is that "health" has such a broad meaning and the nature and quantity of symptoms necessary to define oneself as ill differ for individuals. For this reason, to operationalize perception of health two dimensions have been used:

- 1) dental conditions¹ and non-dental conditions;² and
- 2) health belief variables; that is, susceptibility, severity, preventability and mutability.

There were additional operational difficulties with this second dimension in that preventability and mutability were not discriminating enough variables; i.e. most of the respondents thought that they themselves could do a great deal to prevent these health conditions and that the health professions could also do a great deal to cure or correct these same conditons.

Perceived Susceptibility

Becker and Maiman (1975), Health Belief Model posits that those who feel more susceptible to illness will be more likely to take

¹ "dental conditions" - bleeding gums, broken tooth, toothache and tooth decay.

² "non-dental conditions" - loss of hearing, high blood pressure, stomach ulcers and overweight.

preventive action. Kegeles (1974) reviewed some dental studies which included this aspect to ascertain whether perceived susceptibility was an aspect of preventive dental behaviour. His findings were contradictory and thus inconclusive. From the Ontario data one finds that for the 25-34 year olds significant differences¹ existed on a number of oral morbidity measures (Tables 261 and 262) when related to susceptibility.

The higher perceived susceptibility to dental conditions, the higher the DMF, the higher the number of missing teeth, the higher the number of teeth with gingivitis, the higher the number of teeth needing treatment. Similar results were found in the older age group with the addition of fewer successfully filled teeth, more teeth with periodontitis, but no significant difference in DMF status (Tables 263 and 264).

Severity of Dental Conditions

Relative severity of dental disease was operationalized by a nominal scale of high/low and an eleven stage interval scale. Table 265 presents the marginal distributions for the items used in the scale. Using the first measure, the only significant difference was in the 25-34 year olds. The more severe dental conditions were perceived, the more items were part of the personal dental behaviour of the respondent.

The second scale resulted in different patterns between the two age groups. In the younger group, the more severe dental conditions were viewed, the fewer decayed teeth, the more filled teeth, the less gingivitis. For the older group the more severe perception resulted in

TABLE 261

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY PERCEIVED SUSCEPTIBILITY OF DENTAL CONDITIONS
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	DMF	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Total	428	13.43	6.17		0.95	1.96		8.28	5.74		3.34	4.99			
Low	50	12.70	5.88		0.42	1.01		8.64	5.57		3.36	4.52			
Medium low	64	12.16	6.52		0.42	0.97		8.58	5.43		2.50	4.35			
Medium	92	12.37	5.80		0.50	1.00		9.38	5.64		2.03	3.90			
Medium high	69	12.97	5.77		1.17	2.36		7.75	5.61		3.12	4.27			
High	153	14.82	6.32		1.52	2.51		7.61	5.98		4.57	5.94			

TABLE 262

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY PERCEIVED SUSCEPTIBILITY OF DENTAL CONDITIONS
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	428	10.84	7.31	0.46	1.73	1.86	2.59	1.78	3.29	2.58	1.13
Low	50	7.72	6.67	0.12	0.59	0.70	1.22	1.82	1.53	2.52	0.97
Medium low	64	9.16	7.42	0.38	1.15	1.09	1.50	2.23	4.07	2.69	1.18
Medium	92	10.89	7.05	0.54	1.48	1.35	1.74	1.82	2.23	2.64	1.15
Medium high	69	10.65	7.14	0.68	3.25	2.25	3.17	1.42	1.72	2.42	1.08
High	153	12.61	7.26	0.46	1.27	2.70	3.08	1.73	4.27	2.59	1.18

TABLE 263

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY PERCEIVED SUSCEPTIBILITY OF DENTAL CONDITIONS
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Decayed Teeth		Successfully Filled Teeth		Missing Due to Caries	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	639	15.44	6.64	0.92	1.76	7.61	6.13	5.93	6.32
Low	94	14.23	7.00	0.53	0.95	7.07	5.71	5.84	6.40
Medium low	75	16.00	6.05	0.35	0.74	9.20	6.03	5.55	6.52
Medium	131	14.92	6.12	0.63	1.56	8.92	5.87	4.80	5.87
Medium high	92	15.45	7.40	0.61	1.15	8.23	6.52	4.66	5.56
High	247	15.99	6.60	1.51	2.28	6.19	6.00	7.15	6.55

TABLE 264

MEANS AND STANDARD DEVIATIONS FOR
 SELECTED ORAL MORBIDITY MEASURES BY PERCEIVED SUSCEPTIBILITY OF DENTAL CONDITIONS
 FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		X	SD	X	SD	X	SD	X	SD	X	SD
Total	639	10.31	6.95	1.12	3.02	1.97	2.46	1.69	2.51	2.63	1.17
Low	94	8.94	6.87	0.97	2.15	1.40	1.83	1.86	1.96	2.62	1.11
Medium low	75	8.77	6.54	0.57	1.62	1.28	1.51	1.85	1.54	2.68	1.21
Medium	131	9.34	6.54	0.50	2.58	1.24	1.84	1.86	2.17	2.63	1.17
Medium high	92	10.84	7.31	1.61	3.66	2.05	2.52	1.53	1.67	2.58	1.20
High	247	11.61	6.95	1.49	3.47	2.75	2.90	1.55	3.26	2.65	1.18

TABLE 265

DISTRIBUTION BY NUMBER AND PERCENT OF
MOST AND LEAST SERIOUS CONDITIONS
BY AGE FOR ALL ADULTS, ONTARIO SAMPLE, 1977

Condition	25 - 34 Year Olds				35 - 44 Year Olds			
	Most Serious		Least Serious		Most Serious		Least Serious	
	N	%	N	%	N	%	N	%
Bleeding gums	86	19.5	35	7.9	115	16.4	78	11.1
Broken tooth	24	5.4	108	24.5	31	4.4	204	29.1
Earache	170	38.5	10	2.3	252	35.9	9	1.3
Temp. of 100°F	49	11.1	127	28.8	104	14.8	162	23.1
Sleeplessness	52	11.8	119	27.0	117	16.7	156	22.2
Toothache	50	11.3	33	7.5	72	10.3	76	10.8
DK	4	0.9	3	0.7	10	1.4	14	2.0
NA	6	1.4	6	1.4	1	0.1	3	0.4
Total	441	100.0	441	100.0	702	100.0	702	100.0

a higher DMF and significant differences in number of filled teeth and teeth with periodontitis, but no pattern for these differences could be discerned.

Preventability

Preventability was examined with regard to both dental conditions and non-dental conditions. In the 25-34 year old group the more preventable dental conditions are viewed the higher the DMF, the lower the number of decayed teeth, the higher the number of filled teeth, and the fewer number of teeth with gingivitis.

For the 35-44 year olds, the pattern of significant differences is not the same. Respondents with high preventive beliefs have fewer decayed teeth, more filled teeth and fewer teeth requiring treatment.

As might be expected, attitudes towards the prevention of non-dental conditions are not as related to oral morbidity measures. For the 25-34 age group high prevention is associated with fewer teeth needing treatment. For the older age group the more preventable non-dental conditions are viewed the more filled teeth will be present. Although there is also a significant difference in the number of teeth with periodontitis, there is no discernible pattern for these differences.

Mutability

Mutability was operationalized by how much the respondent felt the health professions could do to cure or correct these dental and non-dental conditions. The only significant difference in mutability of dental conditions was in the 35-44 year old group where the more

one thought could be done the fewer missing teeth were present. Indeed, there are more significant relationships with non-dental conditions. However, although the relationships were significant there was no pattern among responses. For the 25-34 year olds significant differences existed with number of decayed teeth, number of teeth requiring treatment and personal dental behaviour. For the 35-44 year olds, differences existed only in the number of teeth with gingivitis.

Other Measures

In addition to the aforementioned health belief variables, perception of health was also operationalized in terms of dental care needed. As Tables 266 through 269 indicate, respondents appear to have a fairly realistic appraisal of their oral health status. In the 25 to 34 year old group those who perceived that they needed more dental care in the last 12 months than they had received had significantly more decayed teeth, fewer successfully filled teeth, more missing teeth, more gingivitis, more periodontitis and more teeth requiring treatment. As might be expected, this same group made significantly fewer visits to the dentist.

In the 35 to 44 year old group the findings are similar with the addition of those perceiving more care being required having a significantly lower DMF. Although this finding may appear contradictory it should be noted that the Italian population has a lower DMF than other ethnic groups despite the fact that they are low utilizers of dental services.

TABLE 266

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY MORE CARE REQUIRED IN LAST YEAR
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	DMF	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Total	423	13.54	6.10	0.96	1.97	8.36	5.72	3.36	5.00						
More care required in previous year	206	13.32	6.38	1.62	2.51	6.60	5.66	4.16	5.47						
More care not required in previous year	217	13.76	5.83	0.33	0.90	10.03	5.28	2.60	4.40						

TABLE 267

MEANS AND STANDARD DEVIATIONS FOR
 SELECTED ORAL MORBIDITY MEASURES BY MORE CARE REQUIRED IN LAST YEAR
 FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		X	SD	X	SD	X	SD	X	SD	X	SD
Total	423	10.78	7.30	0.46	1.74	1.87	2.60	1.80	3.30	2.57	1.13
More care required in previous year	206	12.23	7.55	0.66	2.23	2.66	3.08	1.06	2.55	2.57	1.21
More care not required in previous year	217	9.41	6.78	0.28	1.04	1.13	1.77	2.51	3.75	2.57	1.06

TABLE 268

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY MORE CARE REQUIRED IN LAST YEAR
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Total	627	15.48	6.63	0.92	1.77	7.62	5.97	6.35						
More care required in previous year	281	14.75	7.04	1.51	2.22	5.13	7.06	6.74						
More care not required in previous year	346	16.07	6.22	0.44	1.08	9.64	5.09	5.89						

TABLE 269

MEANS AND STANDARD SEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY MORE CARE REQUIRED IN LAST YEAR
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	627	10.19	6.90	1.12	3.03	1.97	2.47	1.71	2.52	2.64	1.17
More care required in previous year	281	11.31	7.31	1.68	3.82	2.70	2.81	1.05	2.12	2.55	1.18
More care not required in previous year	346	9.28	6.42	0.66	2.08	1.38	1.97	2.25	2.70	2.71	1.16

Another measure of perception of health was the patient's evaluation of the number of things a dentist would find wrong. As Tables 270 to 273 indicate there are a number of significant relationships between this variable and the oral morbidity measures. For the younger age group, those who perceive that there will be a great many things to be done to their teeth have a significantly poorer oral health status on all of the indicators than those who perceive only a few things wrong or nothing wrong. There were no significant differences in the 25 to 34 year old age group on number of visits or personal behaviour.

For the older age group, 35 to 44, Tables 274 and 275 indicate significant differences on all the oral morbidity measures except DMF, and in addition a significant difference in the number of visits. The pattern is the same as for the 25 to 34 year olds. Those who perceive themselves to have a poorer oral health status (in that they need work done) actually do have a significantly poorer status on all the oral morbidity measures. Those in this category also make significantly fewer dental visits.

Overview

One general statement that can be made about respondents' perception of their health is that they appear able to make a realistic appraisal of their oral health status. This same pattern was noted with the 13 to 14 year olds.

The findings indicate inconsistent relationships between the health belief variables and the oral morbidity measures. This lack of consistency, however, may be a reflection of operational difficulties.

TABLE 270
MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY PERCEIVED NUMBER OF THINGS THE DENTIST WOULD FIND WRONG
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Total	426	13.46	6.15	0.96	1.96	8.31	5.74	3.34	4.99					
A great many things	56	15.14	6.72	2.84	3.32	5.59	5.57	5.38	5.55					
A few things	274	13.64	6.10	0.81	1.64	8.51	5.72	3.38	5.12					
Nothing wrong	96	11.97	5.68	0.26	0.74	9.29	5.47	2.05	3.79					

TABLE 271

MEANS AND STANDARD DEVIATIONS FOR

SELECTED ORAL MORBIDITY MEASURES BY PERCEIVED NUMBER OF THINGS THE DENTIST WOULD FIND WRONG

FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	426	10.83	7.32	0.46	1.73	1.87	2.60	1.79	3.29	2.58	1.13
A great many things	56	15.70	6.96	1.02	3.04	4.30	4.15	1.43	4.10	2.66	1.25
A few things	274	10.38	7.13	0.42	1.54	1.80	2.17	1.78	3.51	2.59	1.14
Nothing wrong	96	9.29	6.98	0.25	0.98	0.65	1.29	2.01	1.82	2.50	1.06

TABLE 272

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY PERCEIVED NUMBER OF THINGS THE DENTIST WOULD FIND WRONG
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Total	631	15.43	6.63	0.92	1.76	7.61	6.13	5.93	6.33					
A great many things	87	15.77	7.09	2.77	2.84	3.89	4.87	7.69	6.72					
A few things	370	15.42	6.65	0.80	1.47	7.45	5.96	6.24	6.34					
Nothing wrong	174	15.28	6.39	0.25	0.65	9.80	6.07	4.40	5.79					

TABLE 273

MEANS AND STANDARD DEVIATIONS FOR
 SELECTED ORAL MORBIDITY MEASURES BY PERCEIVED NUMBER OF THINGS THE DENTIST WOULD FIND WRONG
 FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	631	10.27	6.96	1.16	3.02	1.97	2.46	1.70	2.52	2.64	1.17
A great many things	87	11.13	7.09	2.72	5.11	4.43	3.20	0.84	1.60	2.38	1.12
A few things	370	10.95	6.94	1.06	2.67	1.79	2.13	1.56	2.15	2.68	1.14
Nothing wrong	174	8.40	6.61	0.44	1.78	1.12	1.87	2.43	3.33	2.70	1.23

For example, the problem with trying to operationalize a concept like relative severity in terms of dental and non-dental conditions in a dental survey is that respondents may be biased toward the dental items because it is a dental survey. On the other hand, it is difficult to equate the items as dental conditions are never generally perceived to be life threatening whereas many non-dental conditions are. The other problem with the particular items on the scale is that the dental items can be more easily classified as "conditions" whereas the non-dental items, e.g. temperature of 100^oF, can be viewed as a symptom of a more serious malady. These operational difficulties no doubt contributed to the lack of significant findings.

Past Use of Health Providers

If the use of health services is a generalized behaviour, then one would expect use of health practitioners other than dentists to be related to the use of dentists. As was noted in the analysis of student data these two variables are significantly related. However, for the adult sample a strong relationship between these two variables does not seem to exist. For the younger age group past use of health providers is not related to visits. For the older age group it is significantly related to visits but there is no discernible pattern among the categories.

Past Dental Health Actions

If the best predictor of future behaviour is past behaviour, then it would seem important to investigate past dental health actions carefully.

One aspect of oral health that is worth noting is that individuals have the most responsibility for promoting their own oral health status, as good oral hygiene is probably the best preventive action that can be taken. As Table 276 indicates, virtually all the adults in both age groups say they brush their teeth (95.5% and 94.6%). The next most prevalent dental practice is rinsing after eating with 51.7 percent of the younger age group and 53.3 percent of the older age group engaging in that activity. Collectively, about a quarter of the adults use dental floss on a regular basis.

In terms of the relationship of personal dental behaviour and oral status, Tables 277 to 280 indicate that there are some significant differences. For the 25 to 34 year olds personal dental behaviour is related to number of decayed teeth, number of successfully filled, number of missing teeth, and number of visits to the dentist. Although the pattern is not as definitive as with some other variables the general trend is for more oral hygiene practices to result in a better oral health status and to make more visits to the dentist.

The pattern of differences changes for the older age group in that the only significant relationship is for number of teeth with periodontitis and number of visits. As with the younger age group, the pattern is not definitive but the tendency is for more dental practices to be associated with less periodontitis and more dental visits.

Another important factor in the determination of oral health status is the use of dental services. Instead of operationalizing this by merely looking at number of visits in the the last year, a longer time period was incorporated. The categories were as follows:

TABLE 276

DISTRIBUTION BY NUMBER AND PERCENT OF
DENTAL ACTIVITIES PERFORMED YESTERDAY
BY AGE FOR ALL ADULTS, ONTARIO SAMPLE, 1977

<u>Dental Activity</u>	<u>25-34 Year Olds</u>		<u>35-44 Year Olds</u>	
	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
Massage gums	68	15.4	123	17.5
Use mouthwash	154	34.9	273	38.9
Use dental floss	124	28.1	162	23.1
Brush teeth	421	95.5	664	94.6
Use disclosing tablet	6	1.4	5	0.7
Rinse after eating	228	51.7	374	53.3
Use toothpick	140	31.7	240	34.2
Use waterspray	14	3.2	22	3.1

TABLE 277

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY PERSONAL DENTAL BEHAVIOUR¹
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	DMF	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Total	428	13.43	6.17		0.95	1.94		8.28	5.69		3.34	4.94			
0	4	16.00	13.44		4.00	4.32		0.00	0.00		11.75	12.87			
1	71	14.06	5.92		0.73	1.51		9.37	5.68		3.23	5.06			
2	140	13.31	5.88		0.91	1.89		8.03	5.33		3.64	5.31			
3	122	12.90	6.30		0.90	1.93		8.38	5.97		2.69	3.94			
4	70	13.79	6.53		1.27	2.41		7.86	6.20		3.66	5.38			
5	19	12.95	5.63		0.68	1.20		8.32	5.16		2.84	2.95			
6	2	18.00	4.24		0.50	0.71		12.50	0.71		3.00	4.24			

¹ Number of activities engaged in

TABLE 278

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY PERSONAL DENTAL BEHAVIOUR¹
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	428	10.84	7.34	0.46	1.73	1.86	2.59	1.78	3.14
0	4	10.25	7.14	0.00	0.00	4.25	3.79	0.00	0.00
1	71	11.56	7.30	0.66	2.73	1.55	2.06	1.38	1.45
2	140	10.76	7.74	0.44	1.74	1.71	2.55	1.63	2.05
3	122	10.39	7.01	0.40	1.22	1.89	2.59	1.55	1.68
4	70	10.91	7.32	0.33	1.10	2.29	3.12	2.61	6.17
5	19	11.79	6.80	0.89	1.82	1.79	1.93	1.79	1.32
6	2	7.00	2.83	0.00	0.00	2.50	0.71	15.50	20.51

¹ Number of activities engaged in

TABLE 279

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY PERSONAL DENTAL BEHAVIOUR¹
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	DMF	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries
Total	639	15.44	6.64		0.92	1.76		7.61	6.13	5.93	6.32		
0	8	11.13	9.22		1.38	2.33		3.13	5.25	6.25	9.72		
1	105	16.02	6.48		1.23	2.10		7.19	6.17	6.65	7.05		
2	182	16.03	6.32		0.96	1.72		8.13	6.29	5.84	6.46		
3	206	15.45	6.38		0.79	1.70		7.69	6.02	6.03	6.08		
4	101	14.67	7.11		0.92	1.60		6.93	5.71	5.78	5.90		
5	30	13.63	7.80		0.53	1.61		8.03	6.89	4.63	5.34		
6	7	14.43	7.72		0.29	0.76		11.43	6.45	2.00	1.83		

¹ Number of activities engaged in

TABLE 280

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY PERSONAL DENTAL BEHAVIOUR¹
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	Gingivitis				Periodontitis				Number of Teeth Needing Some Treatment				Visits			
	N	$\bar{X}$	SD		$\bar{X}$	SD			$\bar{X}$	SD			$\bar{X}$	SD		
Total	639	10.31	6.95		1.12	3.02			1.97	2.46			1.69	2.51		
0	8	13.50	9.27		4.38	4.98			2.13	2.80			2.63	2.72		
1	105	11.02	6.90		1.39	3.79			2.30	2.68			1.01	1.43		
2	182	10.93	6.96		0.86	2.38			2.14	2.47			1.70	2.37		
3	206	10.04	7.11		1.08	2.94			1.79	2.40			1.80	3.10		
4	101	9.25	6.45		1.34	3.27			2.00	2.45			1.82	2.10		
5	30	9.30	5.62		0.30	0.84			1.00	1.88			2.67	2.81		
6	7	7.43	10.03		1.71	4.54			1.29	1.38			1.57	1.40		

¹ Number of activities engaged in

Recent Consistent User	saw the dentist in the last 12 months and in the previous year.
Recent One Time and Intermittent User	saw the dentist in the last 12 months but no visits in the previous three years.
Remote User	no visit in the last 12 months.
Never used User	never any dental visits.

For both age groups user type is significantly related to all the measures of oral morbidity except personal dental behaviour (Tables 281 to 284). The "never used" group in both age categories seems to be an anomaly in that they both have a significantly lower DMF than the other user types. As has been mentioned previously, Canada has a high proportion of immigrants among its adult population. Among these immigrants are a number of groups with traditionally low DMF's and low utilization patterns. If one removes the "never used" group from comparisons, the pattern that emerges indicates that the more recent and the more consistent the use of dental services the better one's oral health status.

Another perspective on past dental health actions is to investigate some of the situations the respondent might be exposed to. For example, Tables 285 to 288 investigates the impact of fluoride applications on oral health status. For the 25 to 34 year olds fluoride applications are related to a higher DMF, fewer decayed teeth, more successfully filled teeth, fewer missing teeth, less gingivitis, less periodontitis, and fewer teeth needing treatment. For the older age group the pattern is the same except that there was no significant difference in the amount of gingivitis.

TABLE 281

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY FREQUENCY OF DENTAL VISITS/USER TYPE
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	DMF	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Total	427	13.44	5.91	0.96	1.88	8.29	5.22	3.33	4.84						
Recent															
Consistent	228	14.00	5.32	0.43	1.32	10.35	5.12	2.28	3.48						
Recent															
One time and intermittent	46	14.24	6.05	1.24	1.88	7.48	5.51	4.54	4.88						
Remote	136	13.34	6.65	1.71	2.57	5.98	5.47	4.88	6.51						
Never used	17	4.41	6.73	1.12	1.69	1.35	3.02	1.76	4.78						

TABLE 282

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY FREQUENCY OF DENTAL VISITS/USER TYPE
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	Gingivitis	Periodontitis	Number of Teeth Needing Some Treatment	Personal Dental Behaviour
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	427	10.84	7.07	0.46	1.72	1.86	2.58 1.13
Recent Consistent	228	9.52	6.66	0.26	0.97	1.39	2.67 1.12
Recent One time and intermittent	46	12.83	7.33	0.46	1.44	2.26	2.52 1.19
Remote	136	11.40	7.71	0.77	2.59	2.59	2.44 1.14
Never used	17	18.65	6.37	0.65	1.50	1.41	2.59 1.06

TABLE 283

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY FREQUENCY OF DENTAL VISITS/USER TYPE
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	DMF	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Total	639	15.44	6.59		0.92	1.68		7.61	5.44		5.93	6.07			
Recent	345	15.90	5.90		0.43	1.08		10.13	5.80		4.25	4.74			
Recent															
One time and intermittent	53	16.02	6.33		1.17	2.06		6.70	5.89		7.55	6.40			
Remote	219	15.01	7.39		1.58	2.25		4.50	4.92		8.02	7.41			
Never used	22	10.95	8.73		1.50	1.77		1.36	2.54		7.55	8.56			

TABLE 284

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY FREQUENCY OF DENTAL VISITS/USER TYPE
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	Periodontitis $\bar{X}$	SD	Number of Teeth Needing Some Treatment $\bar{X}$	SD	Personal Dental Behaviour $\bar{X}$	SD
Total	639	10.31	6.83	1.12	3.00	1.97	2.43	2.63	1.16
Recent Consistent	345	9.33	6.49	0.82	2.64	1.60	2.24	2.75	1.17
Recent One time and intermittent	53	9.66	6.85	1.68	4.22	1.91	2.57	2.77	1.20
Remote	219	11.53	7.10	1.34	2.99	2.55	2.69	2.40	1.13
Never used	22	15.09	8.97	2.18	4.64	2.14	2.14	2.77	1.19

TABLE 285

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY FREQUENCY OF FLUORIDE APPLICATIONS
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Decayed Teeth		Successfully Filled Teeth		Missing Due to Caries	
		X	SD	X	SD	X	SD	X	SD
Total	410	13.40	6.14	0.91	1.83	8.27	4.98	3.37	5.01
Sometimes	132	14.36	5.41	0.47	1.31	10.20	5.85	2.67	4.21
Never	278	12.95	6.46	1.12	2.03	7.36	5.58	3.70	5.35

18 cases missing

TABLE 286

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY FREQUENCY OF FLUORIDE APPLICATIONS
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	Gingivitis			Periodontitis			Number of Teeth Needing Some Treatment			Visits			Personal Dental Behaviour		
	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$
Total	410	10.70	7.25	0.46	1.73	1.81	1.81	2.52	1.78	3.35	2.59	1.12			
Sometimes	132	9.31	7.28	0.16	0.71	1.48	1.48	2.42	1.95	1.84	2.76	1.13			
Never	278	11.36	7.24	0.60	2.05	1.97	1.97	2.57	1.70	3.86	2.51	1.12			

18 cases missing

TABLE 287

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MEASURES BY FREQUENCY OF FLUORIDE APPLICATIONS.
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Decayed Teeth		Successfully Filled Teeth		Missing Due to Caries	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	621	15.52	6.54	0.92	1.72	7.66	5.83	5.96	6.26
Sometimes	152	16.82	5.44	0.36	1.04	11.00	5.50	4.53	4.66
Never	469	15.10	6.86	1.10	1.89	6.57	5.93	6.43	6.69

TABLE 288
MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY FREQUENCY OF FLUORIDE APPLICATIONS
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	621	10.19	6.89	1.10	3.01	1.98	2.43	1.67	2.40	2.65	1.16
Sometimes	152	9.91	7.41	0.49	1.41	1.30	2.19	2.32	2.42	2.76	1.12
Never	469	10.28	6.71	1.30	3.37	2.20	2.51	1.47	1.95	2.61	1.18

Another component of past dental actions is motivation. Becker and Maiman (1975) identify this as being a key factor in preventive dental behaviour. In dental services the use of a recall system could be viewed as a motivational cue. Tables 289 to 292 present the findings with regard to the effects of a recall system on oral health status. In the 25 to 34 year old age category being contacted by the dentist results in a significantly higher DMF, fewer decayed teeth, more filled teeth, fewer missing teeth, less gingivitis, and fewer teeth needing treatment. (Tables 289 and 290). For the older age group those whose dentist contacts them have significantly fewer decayed teeth, fewer successfully filled teeth, fewer missing teeth, less periodontitis and they also make significantly more dental visits. From these data it would appear that instituting a recall system has a positive effect on oral health status.

Perception of Dental Health Needs

Besides the perception of health and past dental actions, perception of dental needs would seem to be an important component in contributing to the present use of dental health services. Before a need is perceived, however, some condition must be present. Table 293 indicates the distribution of respondents experiencing a range of conditions in the last 12 months. As with the students, bad breath is the most likely condition to be experienced by both adult age groups. The problem with this is that it was not specified for the respondent whether that meant chronic or occasional bad breath, so consequently the figure reported for those experiencing the condition may be inflated.

TABLE 289

MEANS AND STANDARD DEVIATIONS FOR

SELECTED ORAL MORBIDITY MEASURES BY DENTIST'S USE OF A RECALL SYSTEM

FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Total	269	13.97	5.43	0.58	1.47	9.83	5.32	2.65	3.85					
Contacts in some way	179	14.43	5.24	0.34	1.03	10.75	5.08	2.41	3.50					
Does not contact	90	13.07	5.70	1.04	2.01	7.99	5.33	3.14	4.45					

TABLE 290
MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY DENTIST'S USE OF A RECALL SYSTEM
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	269	10.00	6.84	0.30	1.08	1.51	2.27	2.81	3.79	2.66	1.13
Contacts in some way	179	9.18	6.35	0.27	1.00	1.28	1.97	2.94	4.03	2.66	1.08
Does not contact	90	11.62	7.48	0.36	1.21	1.97	2.73	2.53	3.25	2.64	1.25

TABLE 291

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY DENTIST'S USE OF A RECALL SYSTEM
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries
Total	395	15.96	5.92	0.52	1.27		9.73	5.94	4.68	5.07		
Contacts in some way	272	15.92	5.75	0.35	0.92		10.20	5.61	4.25	4.42		
Does not contact	123	16.06	6.32	0.90	1.77		8.69	6.51	5.64	6.17		

TABLE 292

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY DENTIST'S USE OF A RECALL SYSTEM
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	395	9.34	6.50	0.94	2.92	1.64	2.28	2.70	2.71	2.76	1.17
Contacts in some way	272	9.20	6.32	0.69	2.15	1.51	2.18	2.90	3.09	2.82	1.19
Does not contact	123	9.65	6.90	1.48	4.10	1.91	2.47	2.25	1.48	2.64	1.12

TABLE 293

DISTRIBUTION BY NUMBER AND PERCENT OF
DENTAL CONDITIONS EXPERIENCED BY AGE
FOR ALL ADULTS, ONTARIO SAMPLE, 1977

Condition Experienced	25 - 34 Year Olds		35 - 44 Year Olds	
	N	%	N	%
Swelling of cheek	52	11.8	64	9.1
Broken tooth	67	15.2	89	12.7
Sore on gums	95	21.5	182	25.9
Sore on mouth	123	27.9	139	19.8
Bad breath	169	38.3	261	37.2
Bleeding gums	146	33.1	188	26.8
Toothache	130	29.5	178	25.4

In terms of the relationship between number of conditions experienced and the selected oral morbidity measures, there are only a few significant associations. In the 25 to 34 year olds group there is a significant difference in the number of successfully filled teeth, but there is no discernible pattern for these differences. Number of conditions is associated with more oral morbidity measures in the 35 to 44 year old group. For example, experiencing more conditions is related to significantly more decayed teeth, more periodontitis, more teeth requiring treatment and more dental visits (Tables 294 and 295).

Another way in which a need may be expressed is in terms of satisfaction with one's present condition. Respondents were asked to indicate their level of satisfaction with their general health, their teeth and their gums. There were no significant relationships between satisfaction with general health and any of the oral morbidity measures.

On the other hand in the 25 to 34 year old group more satisfaction with teeth is related to a significantly lower DMF, fewer decayed teeth, less gingivitis, and fewer teeth requiring treatment (Tables 296 and 297).

In the older age group, as Tables 298 and 299 indicate, higher levels of satisfaction with teeth are related to a lower DMF, fewer decayed teeth, fewer missing teeth, less periodontitis and fewer teeth requiring treatment.

Tables 300 to 303 present the findings for the same oral morbidity measures by level of satisfaction with gums. Both age groups have the same pattern. The higher the level of satisfaction the fewer decayed

TABLE 294

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY NUMBER OF CONDITIONS
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	DMF	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Total	639	15.44	6.69		0.92	1.75		7.61	6.15		5.93	6.33			
0	161	15.84	6.79		0.76	1.53		7.47	6.33		6.74	7.00			
1	177	15.24	6.63		0.62	1.10		7.63	5.72		5.93	6.09			
2	146	15.37	6.63		1.16	2.03		8.04	6.40		5.40	6.01			
3	91	15.53	6.54		1.14	1.99		7.70	6.26		5.38	5.70			
4	43	14.77	6.83		1.05	2.40		7.49	6.31		5.28	6.81			
5	14	15.57	6.30		1.86	2.57		4.79	5.10		8.07	6.21			
6	6	15.33	7.12		2.17	3.37		7.33	6.41		5.50	7.40			
7	1	13.00	0.00		1.00	0.00		3.00	0.00		4.00	0.00			

TABLE 295

MEANS AND STANDARD DEVIATIONS FOR
 SELECTED ORAL MORBIDITY MEASURES BY NUMBER OF CONDITIONS
 FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	639	10.31	6.95	1.12	2.99	1.97	2.44	1.69	2.48	2.63	1.17
0	161	9.46	6.74	0.71	1.89	1.66	2.08	1.32	1.67	2.62	1.19
1	177	10.38	7.52	0.69	1.86	1.71	2.24	1.42	1.60	2.61	1.13
2	146	11.48	7.02	1.51	3.55	2.08	2.61	1.72	2.37	2.60	1.13
3	91	10.15	6.67	1.62	4.03	2.59	2.77	2.31	4.40	2.69	1.19
4	43	9.84	5.66	1.44	3.42	2.07	2.82	2.33	2.86	2.95	1.33
5	14	9.86	6.49	3.00	7.14	2.79	2.75	2.14	2.25	2.21	1.19
6	6	9.33	6.09	0.33	0.82	2.50	3.88	2.83	2.32	2.17	0.98
7	1	10.00	0.00	5.00	0.00	6.00	0.00	8.00	0.00	3.00	0.00

TABLE 296

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY SATISFACTION WITH CONDITION OF TEETH
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	X	SD	X	SD	X	SD	X	SD
Total	428	13.43	6.17	0.95	1.96	8.28	5.74	3.34	4.99
Very dissatisfied	53	16.91	6.18	1.60	2.60	8.42	6.26	5.26	6.50
Somewhat dissatisfied	90	14.11	5.86	1.74	2.84	7.00	5.94	4.36	5.10
Somewhat satisfied	157	13.28	5.89	0.75	1.46	9.02	5.77	2.73	4.45
Very satisfied	127	11.69	6.14	0.38	0.93	8.19	5.23	2.60	4.53

1 case missing

TABLE 297

MEANS AND STANDARD DEVIATIONS FOR
 SELECTED ORAL MORBIDITY MEASURES BY SATISFACTION WITH CONDITION OF TEETH
 FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periosontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	428	10.84	7.31	0.46	1.73	1.86	2.59	1.78	3.29	2.58	1.13
Very dissatisfied	53	11.96	7.50	0.43	1.12	3.25	3.67	1.58	2.02	2.64	1.26
Somewhat dissatisfied	90	12.74	7.35	0.49	1.30	2.77	3.36	1.61	1.86	2.74	1.19
Somewhat satisfied	157	10.13	6.88	0.54	2.38	1.64	2.01	1.51	1.65	2.45	1.06
Very satisfied	127	9.91	7.51	0.36	1.17	0.92	1.37	2.33	5.35	2.61	1.11

TABLE 298

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY SATISFACTION WITH CONDITION OF TEETH
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Total	639	15.44	6.56	0.92	1.63	7.61	5.91	5.93	6.04					
Very dissatisfied	84	16.63	6.90	2.54	2.82	3.67	4.78	9.27	7.28					
Somewhat dissatisfied	141	16.34	6.48	1.16	1.82	6.86	5.93	7.11	6.19					
Somewhat satisfied	242	15.53	6.09	0.62	1.32	8.93	6.09	4.98	5.36					
Very satisfied	170	13.85	7.08	0.37	0.90	8.30	6.11	4.43	6.14					

2 cases missing

TABLE 299

MEANS AND STANDARD DEVIATIONS FOR
 SELECTED ORAL MORBIDITY MEASURES BY SATISFACTION WITH CONDITION OF TEETH
 FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	639	10.31	6.95	1.12	3.00	1.97	2.33	1.69	2.50	2.64	1.16
Very dissatisfied	84	10.20	6.59	2.02	4.40	3.70	3.33	0.95	1.77	2.44	1.06
Somewhat dissatisfied	141	10.43	6.42	1.44	3.36	2.48	2.55	1.69	3.66	2.70	1.08
Somewhat satisfied	242	10.73	7.12	0.74	2.38	1.66	2.18	1.81	2.15	2.58	1.12
Very satisfied	170	9.75	7.29	0.95	2.58	1.16	1.62	1.91	2.06	1.75	1.31

TABLE 300

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY SATISFACTION WITH CONDITION OF GUMS
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Total	428	13.43	6.17	0.95	1.96	8.28	5.74	3.34	4.99					
Very dissatisfied	32	14.84	5.48	1.16	2.08	8.06	5.61	4.63	5.43					
Somewhat dissatisfied	60	13.92	6.49	1.72	2.82	6.57	5.80	4.38	6.51					
Somewhat satisfied	142	12.88	6.24	1.06	1.91	7.75	5.91	3.20	4.59					
Very satisfied	193	13.51	6.07	0.61	1.55	9.28	5.45	2.92	4.60					

1 case missing

TABLE 301

MEANS AND STANDARD DEVIATIONS FOR
 SELECTED ORAL MORBIDITY MEASURES BY SATISFACTION WITH CONDITIONS OF GUMS
 FOR 24 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	428	10.84	7.31	0.46	1.73	1.86	2.59	1.78	3.29	2.58	1.13
Very dissatisfied	32	10.69	6.55	1.69	3.96	2.34	2.86	1.56	1.70	2.63	1.21
Somewhat dissatisfied	60	13.40	7.83	0.37	1.01	2.98	3.41	1.42	1.96	2.67	1.20
Somewhat satisfied	142	12.26	7.18	0.45	1.80	2.00	2.59	1.88	4.51	2.68	1.07
Very satisfied	193	8.96	6.89	0.30	1.07	1.34	2.10	1.87	2.72	2.47	1.15

TABLE 302

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY SATISFACTION WITH CONDITION OF GUMS
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Decayed Teeth		Successfully Filled Teeth		Missing Due to Caries	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	639	15.44	6.65	0.92	1.73	7.61	6.13	5.93	6.34
Very dissatisfied	47	14.98	6.22	2.02	2.70	5.34	5.56	6.51	6.41
Somewhat dissatisfied	121	14.80	7.05	1.13	1.77	6.79	6.06	5.86	6.62
Somewhat satisfied	191	15.68	6.47	0.81	1.59	8.23	6.38	5.72	5.95
Very satisfied	276	15.65	6.64	0.73	1.61	7.93	5.99	6.05	6.48

4 cases missing

TABLE 303

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY SATISFACTION WITH CONDITIONS OF GUMS
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	Gingivitis			Periodontitis			Number of Teeth Needing Some Treatment			Visits			Personal Dental Behaviour		
	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	SD
Total	639	10.31	6.88	1.12	2.96	1.97	1.97	2.42	1.69	2.50	2.63	1.17			
Very dissatisfied	47	11.53	6.55	3.04	5.97	3.49	3.49	3.16	1.11	1.49	2.53	1.12			
Somewhat dissatisfied	121	12.04	7.37	1.28	3.19	2.22	2.22	2.52	1.51	2.21	2.71	1.14			
Somewhat satisfied	191	10.44	6.61	1.28	2.94	1.79	1.79	2.18	2.07	3.56	2.66	1.17			
Very satisfied	276	9.24	6.87	0.63	1.95	1.73	1.73	2.39	1.62	1.78	2.61	1.20			

teeth, the more successfully filled teeth, the less gingivitis and periodontitis and the fewer teeth requiring some treatment. In general then, it would appear that the adults in both age groups are able to realistically evaluate their oral health status. Those who are satisfied have significantly better teeth than those who are dissatisfied.

Another aspect of the evaluation of present dental health needs is the present need for treatment. Treatment was divided into restorative, periodontal and denture. Table 304 lists the significant relationships with oral morbidity measures and the direction of those differences. For example as the first section indicates the more treatment the respondent perceives he/she needs as determined by clinical examination, the higher is his/her present DMF, number of decayed teeth, number of missing teeth, number of teeth needing treatment, and the fewer dental visits that have been made. In general, one could surmise from the findings in Table 305 that the respondents have a realistic view of their actual treatment needs.

Since the findings, thus far presented, seem to indicate that generally speaking, adults are capable of evaluating what their present oral health status is and whether they need treatment, one would expect that this awareness would lead to some kind of action. Since it does not it would seem important to investigate the reasons why respondents do or do not visit the dentist (i.e. have their perceived dental needs attended to).

Table 305 presents the distribution of the most and least important reasons for taking care of one's teeth. It would appear that for both

TABLE 304

SIGNIFICANT DIFFERENCES IN SELECTED ORAL MORBIDITY MEASURES
BY PERCEPTION OF NEED FOR TREATMENT BY AGE GROUP
FOR DENTATE ADULTS, ONTARIO SAMPLE, 1977

Oral Morbidity Measure	Need for Restorative Treatment		Need for Periodontal Treatment		Need for Denture Treatment	
	25 - 34	35 - 44	25 - 34	35 - 44	25 - 34	35 - 44
DMF	+	+		-	+	+
Decayed teeth	+	+	+	+	+	+
Successfully filled teeth		-	-	-	-	-
Missing teeth	+	+	+	+	+	+
Gingivitis			+	+		
Periodontitis			+	+		+
Teeth needing treatment	+	+		+	+	+
Visits	-	-		-	-	-
Personal dental behaviour						

TABLE 305

DISTRIBUTION BY NUMBER AND PERCENT OF
MOST AND LEAST IMPORTANT REASON FOR TAKING CARE OF TEETH BY AGE
FOR ALL ADULTS, ONTARIO SAMPLE, 1977

Reasons For Caring For Teeth	25 - 34 Year Olds				35 - 44 Year Olds			
	Most Important		Least Important		Most Important		Least Important	
	N	%	N	%	N	%	N	%
Appearance	25	5.7	149	33.8	30	4.3	288	41.0
Prevent other illness	81	18.4	70	15.9	152	21.7	84	12.0
Avoid later treatment	28	6.3	117	26.5	35	5.0	141	20.1
Avoid future pain	15	3.4	79	17.9	24	3.4	129	18.4
Keep teeth	286	64.9	15	3.4	451	64.2	21	3.0
DK	5	1.1	9	2.0	9	1.3	37	5.3
NA	1	0.2	2	0.5	1	0.1	2	0.3
Total	441	100.0	441	100.0	702	100.0	702	100.0

age groups to keep one's teeth for as long a time as possible is the most important reason for looking after teeth and appearance is the least important reason.

For those who do visit the dentist, 58 percent of the 25 to 34 year olds do so for asymptomatic reasons and 59 percent of the 35 to 44 year olds do so for asymptomatic reasons. Table 306 indicates the relationship of reasons for visiting and oral morbidity measures. For both groups asymptomatic reasons are associated with fewer decayed teeth, more successfully filled teeth and fewer missing teeth. One noteworthy finding is that asymptomatic visiting behaviour results in significantly fewer visits for the 35 to 44 year old group. While asymptomatic visits could generate a few more visits for some kind of treatment, symptomatic visits could result in many more treatment visits because a previously minor problem has been allowed to develop into a major problem.

For those who have not visited a dentist in the last three years the distribution of reasons in their decision not to make a visit is presented in Table 307. The most prevalent reason for not visiting the dentist is that respondents have evaluated their dental condition and decided that nothing was wrong. The least important reason was that they didn't want to spend the money.

As has been mentioned previously it would appear that adults in both age groups are able to make a fairly realistic appraisal of their oral health status when status is evaluated by oral morbidity measures by level of satisfaction and perception of susceptibility. However,

TABLE 306

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY SELECTED VISITING PATTERNS
FOR 35-44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Asymptomatic visits	236	16.06	5.89	0.29	0.68	10.83	5.51	3.95	4.33					
Symptomatic visits	161	15.77	6.04	0.87	1.78	7.99	5.14	5.81	5.92					

TABLE 307

DISTRIBUTION BY NUMBER AND PERCENT OF
REASONS FOR NOT VISITING THE DENTIST BY AGE GROUP
FOR ADULTS WHO HAVE MADE NO VISITS IN THREE YEARS

ONTARIO SAMPLE, 1977

Reason For Not Visiting Dentist	25-34 Years Old		35-44 Years Old	
	N	%	N	%
Nothing wrong	54	43.5	73	46.5
Afraid of dentists	19	15.3	22	14.0
Cannot afford it	26	21.0	34	21.7
Didn't want to spend money	1	0.8	0	0.0
Was too busy	16	12.9	21	13.4
Have no teeth or false teeth	2	1.6	6	3.8
Other	6	4.8	7	4.5
Total	124	100.0	157	100.0

as Tables 308 to 311 indicate, when one looks at visiting patterns it would appear that those that visit although nothing is wrong and those who don't visit because nothing is wrong have different standards for "nothing wrong". For both age groups the asymptomatic group had fewer decayed and missing teeth than the other two groups. In general, the asymptomatic group also fared better on the oral hygiene measures. Thus, it would appear that the respondents evaluation of their oral health status does not necessarily result in the appropriate action being taken either because they do not have the knowledge and skills to do a realistic evaluation or because they have a different conception of what action is appropriate for that condition.

TABLE 308

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY SELECTED VISITING PATTERNS
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Asymptomatic visits	159	13.96	5.08	0.25	0.84				10.64	4.79		2.18	3.46	
Symptomatic visits	115	14.17	5.92	1.01	1.94				8.80	5.76		3.32	4.24	
Nothing wrong no visits	54	10.24	6.36	1.37	2.29				4.56	4.54		3.80	5.67	

TABLE 309

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY SELECTED VISITING PATTERNS
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Asymptomatic visits	159	9.86	6.92	0.21	0.92	1.14	1.75	2.46	4.06	2.68	1.13
Symptomatic visits	115	10.38	6.82	0.40	1.24	2.08	2.78	3.23	2.25	2.60	1.14
Nothing wrong no visits	54	13.76	7.74	0.43	1.35	1.96	2.60	-	-	2.78	1.18

TABLE 310
MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY SELECTED VISITING PATTERNS
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	DMF		Decayed Teeth		Successfully Filled Teeth		Missing Due to Caries	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Asymptomatic visits	236	16.06	5.89	0.29	0.68	10.83	5.51	3.95	4.33
Symptomatic visits	161	15.77	6.04	0.87	1.78	7.99	5.14	5.81	5.92
Nothing wrong no visits	73	12.30	8.34	1.30	1.80	3.25	4.07	7.44	7.87

TABLE 311
MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY SELECTED VISITING PATTERNS
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Asymptomatic visits	236	9.47	6.48	0.63	1.91	1.32	1.91	2.24	1.49	2.76	1.16
Symptomatic visits	161	9.16	6.53	1.39	3.91	2.12	2.69	3.40	3.76	2.76	1.20
Nothing wrong no visits	73	11.53	7.49	1.90	4.42	1.81	1.98	-	-	2.40	1.21

Perceived Availability

It would seem reasonable to assume that a person's perception of whether dentists were available would affect their attempt to use services and consequently their oral health status. Alternatively, unsuccessful attempts to use services could result in a perception that dentists are not available and this attitude in turn could have deleterious effects on oral health status. Unfortunately, with the data available it is impossible to discern whether the attitude impeded behaviour or whether experience produced the attitude. In terms of the relationship of perceived availability to oral health status, for 25 to 34 year olds the higher the perceived availability the more successfully filled teeth and the fewer missing teeth. Although not significant there was a definite trend for fewer teeth needing treatment. (Tables 312 and 313). In the older age group high perceived availability was related to fewer decayed teeth, more filled teeth, fewer missing teeth, fewer treatment needs and more dental visits (Tables 314 and 315).

In general, then, it would appear that those who perceive dental services as unavailable have more unmet needs than those who perceive these services as available.

TABLE 312

MEANS AND STANDARD DEVIATIONS FOR

SELECTED ORAL MORBIDITY MEASURES BY PERCEIVED AVAILABILITY OF DENTISTS

FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	DMF			Decayed Teeth			Successfully Filled Teeth			Missing Due to Caries		
	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	$\bar{X}$	SD	$\bar{X}$	$\bar{X}$	SD	SD
Total	413	13.52	6.18	0.94	1.97	8.32	8.32	5.76	3.41	3.41	5.05	5.05
Low	123	13.06	6.53	1.07	2.14	6.98	6.98	5.38	4.19	4.19	6.18	6.18
Medium	149	13.29	5.91	0.97	1.94	8.83	8.83	5.81	2.58	2.58	4.07	4.07
High	141	14.16	6.15	0.82	1.84	8.96	8.96	5.88	3.60	3.60	4.79	4.79

15 cases missing

TABLE 313

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY PERCEIVED AVAILABILITY OF DENTISTS
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	413	10.79	7.30	0.44	1.72	1.84	2.59	1.80	3.33	2.59	1.14
Low	123	11.04	7.28	0.52	1.42	1.94	2.75	1.98	4.82	2.52	1.10
Medium	149	11.11	7.29	0.36	1.89	1.93	2.70	1.66	1.64	2.66	1.16
High	141	10.24	7.36	0.47	1.78	1.66	2.32	1.80	3.07	2.58	1.15

TABLE 314

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY PERCEIVED AVAILABILITY
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	621	15.46	6.64	0.91	1.72	7.59	6.09	5.99	6.29
Low	215	15.74	6.71	1.28	2.04	6.72	5.84	6.80	6.49
Medium	171	15.61	6.53	0.92	1.85	7.20	6.17	6.64	6.67
High	235	15.10	6.65	0.57	1.22	8.67	6.26	4.77	5.81

18 cases missing

TABLE 315

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY PERCEIVED AVAILABILITY OF DENTISTS
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	621	10.28	6.90	1.14	3.06	1.96	2.44	1.71	2.51	2.63	1.17
Low	215	11.07	6.96	1.18	2.90	2.29	2.55	1.32	1.81	2.66	1.12
Medium	171	9.19	6.51	1.16	3.24	1.85	2.46	1.53	1.73	2.62	1.22
High	235	10.35	7.11	1.11	3.07	1.74	2.31	2.19	3.39	2.62	1.18

Perceived Accessibility

When describing the factors which influence the use of health services "accessibility" is one which is felt to be particularly important. In fact, one of the primary reasons for introducing a universal health insurance plan in Canada was to remove the economic barriers to health care. In terms of dental services accessibility was operationalized in three ways: ease of getting an appointment, time, and economics.

Table 316 presents the significant findings with regard to frequency of difficulty in getting a dental appointment. There are very few significant relationships, but it does appear that for the 25 to 34 year old group, the more difficulty one has the fewer successfully filled teeth one has. In the older age group increasing difficulty is significantly related to more decayed and missing teeth and fewer successfully filled teeth.

Time was measured subjectively (i.e. whether the respondent felt he waited too long) and objectively (i.e. actual waiting time). As Table 317 indicates, although the pattern of significant differences is not identical the direction of the relationship is the same. In general, the longer one waits, or the more the respondent perceives the wait to be too long, the worse the oral health status and the fewer dental visits are made. Length of waiting time is significantly related to more decayed teeth, fewer filled teeth, more missing teeth, more gingivitis and more treatment needed.

The most usual way of operationalizing accessibility is in terms of economic barriers. Table 318 presents the significant findings

TABLE 316

SIGNIFICANT DIFFERENCES IN SELECTED ORAL MORBIDITY MEASURES
BY FREQUENCY OF DIFFICULTY IN GETTING A DENTAL APPOINTMENT
BY AGE GROUP, FOR ADULTS, ONTARIO SAMPLE, 1977

Oral Morbidity Measures	25 - 34	35 - 44
DMF		
Decayed teeth		+
Successfully filled teeth	-	-
Missing due to caries		+
Gingivitis		
Periodontitis		
Treatment needed		
Visits		
Personal dental behaviour		

TABLE 317

SIGNIFICANT DIFFERENCES IN SELECTED ORAL MORBIDITY MEASURES
BY PERCEIVED AND ACTUAL WAITING TIME FOR DENTIST
BY AGE GROUP FOR ADULTS, ONTARIO SAMPLE, 1977

Oral Morbidity Measures	Perceived Waiting Time Too Long		Length Of Actual Waiting Time	
	25-34	35-44	25-34	35-44
DMF				-
Decayed teeth		+	+	+
Successfully filled teeth	-	-	-	-
Missing due to caries		+	+	
Gingivitis	+	+	+	+
Periodontitis				
Treatment needed		+	+	+
Visits	-	-		-
Personal dental behaviour				

TABLE 318

SIGNIFICANT DIFFERENCES IN SELECTED ORAL MORBIDITY MEASURES
BY PERCEIVED AND ACTUAL ECONOMIC ACCESSIBILITY
BY AGE GROUP FOR ADULTS, ONTARIO SAMPLE, 1977

Oral Morbidity Measures	Perceived Inaccessibility		No Dental Insurance*	
	25-34	35-44	25-34	35-44
DMF				
Decayed teeth		+	+	+
Successfully filled teeth				
Missing due to caries	+	+		
Gingivitis				
Periodontitis				
Treatment needed				
Visits				
Personal dental behaviour				

* Only those who made dental visits in the last 12 months were asked if they had insurance.

for perceived economic accessibility and actual accessibility (as measured by presence or absence of dental insurance). Although there were few significant findings it does appear that the more inaccessible dental services are (either perceived or actually) the more decayed teeth will be present. As decayed teeth are an indicator of unmet need and delayed dental attention it would appear that accessibility is a factor in promoting the use of dental services promptly.

Acceptability

Another factor contributing to the use of dental services is the acceptability of those services. "Acceptability" would involve an evaluation on the part of the respondent of the practitioner and the content of the treatment.

Table 319 shows the prestige ranking of the dentist by age group. Both groups rank the dentist fairly high with the 25 to 34 year olds placing him/her in third position after physician and lawyer, and the older age group placing the dentist second after physician. When one investigates the prestige ranking of the dentist and its relationship to oral morbidity measures and visiting behaviour there are no noteworthy significant differences. One of the reasons for the lack of conclusive findings is that the distribution on the prestige variable is very narrow; i.e., dentists are uniformly ranked high and thus the variable does not discriminate.

One way in which patients can evaluate the content of treatment is in terms of anticipated pain. With the student sample it was found that anticipated pain was significantly related to oral morbidity

TABLE 319

MEAN STATUS RANKING OF VARIOUS OCCUPATIONS
BY AGE FOR ALL ADULTS, ONTARIO SAMPLE, 1977

Occupation	25 - 34 Year Olds		35 - 44 Year Olds	
	$\bar{X}$	Rank	$\bar{X}$	Rank
Dental Assistant	7.4	8	7.2	8
Dental Hygienist	6.2	6	6.3	6
Dentist*	3.0	3	2.9	2
Denture Therapist	6.4	7	6.5	7
Lawyer*	2.7	2	3.1	3
Nurse	5.3	5	5.1	5
Physician	1.8	1	1.7	1
Plumber	7.7	9	7.5	9
School Teacher	5.0	4	4.6	4

* Discrepancy in ranking between age group

measures and to visiting behaviour. Tables 320 to 323 present the findings for the adult sample. Avoiding dental visits because of anticipated pain is significantly related to more decayed teeth, fewer filled teeth, more missing teeth, more gingivitis and more teeth needing treatment in the 25 to 34 year old age group. Although not significant there is also a trend for fewer dental visits. In the older age group anticipated pain is significantly associated with a higher DMF, more decayed teeth, fewer filled teeth, more missing teeth, more teeth needing treatment and fewer dental visits.

TABLE 320

MEANS AND STANDARD DEVIATIONS FOR

SELECTED ORAL MORBIDITY MEASURES BY FREQUENCY OF AVOIDING DENTAL VISITS BECAUSE OF PAIN

FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	425	13.49	6.14	0.95	1.96	8.33	5.73	3.35	5.00		
All of the time	33	14.27	6.24	2.03	2.32	4.67	5.00	6.85	7.31		
Most of the time	30	12.40	6.59	1.80	1.86	6.10	5.70	3.13	4.07		
Some of the time	49	13.00	6.44	1.71	3.30	7.04	5.24	3.33	5.30		
Never	313	13.58	6.05	0.63	1.51	9.13	5.65	3.00	4.60		

TABLE 321
MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY FREQUENCY OF AVOIDING DENTAL VISITS BECAUSE OF PAIN
FOR 25 - 34 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	425	10.78	7.28	0.46	1.73	1.86	2.59	1.80	3.29	2.58	1.14
All of the time	33	11.42	7.19	0.70	3.65	2.94	3.25	0.85	1.18	2.48	1.28
Most of the time	30	15.73	6.21	0.93	1.53	3.20	3.18	1.23	2.19	2.50	1.20
Some of the time	49	11.47	8.29	0.45	1.39	2.65	3.50	1.59	1.84	2.82	1.20
Never	313	10.13	7.05	0.39	1.47	1.50	2.17	1.98	3.67	2.56	1.11

TABLE 322

MEANS AND STANDARD DEVIATIONS FOR
SELECTED ORAL MORBIDITY MEASURES BY FREQUENCY OF AVOIDING DENTAL VISITS BECAUSE OF PAIN
FOR 35 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	$\bar{X}$	SD	$\bar{X}$	SD	Decayed Teeth	$\bar{X}$	SD	Successfully Filled Teeth	$\bar{X}$	SD	Missing Due to Caries	$\bar{X}$	SD
Total	635	15.48	6.60	0.91	1.75	7.63	6.11	5.96	6.33					
All of the time	38	16.05	7.73	2.00	2.67	4.29	5.77	8.92	7.46					
Most of the time	43	16.42	6.83	2.30	3.14	4.53	5.35	8.81	6.93					
Some of the time	81	15.20	6.68	1.09	1.82	6.68	6.09	6.65	6.68					
Never	473	15.40	6.48	0.67	1.34	8.34	6.02	5.35	5.97					

TABLE 323

MEANS AND STANDARD DEVIATIONS FOR

SELECTED ORAL MORBIDITY MEASURES BY FREQUENCY OF AVOIDING DENTAL VISITS BECAUSE OF PAIN

FOR 34 - 44 YEAR OLDS, ONTARIO SAMPLE, 1977

	N	Gingivitis		Periodontitis		Number of Teeth Needing Some Treatment		Visits		Personal Dental Behaviour	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total	635	10.26	6.93	1.12	3.02	1.96	2.46	1.70	2.52	2.63	1.17
All of the time	38	10.18	6.95	1.37	3.56	2.95	3.08	1.00	1.68	2.47	1.18
Most of the time	43	10.88	6.52	1.28	3.03	3.28	3.69	0.95	1.77	2.35	1.11
Some of the time	81	10.16	7.00	0.75	2.23	1.90	2.25	1.65	2.16	2.69	1.10
Never	473	10.23	6.97	1.15	3.10	1.78	2.25	1.83	2.67	2.65	1.18

Summary

Some of the more noteworthy findings related to the influence of sociological factors on oral health status are summarized below for adults aged 25 to 44 years.

1. Social class as measured by occupation and education is significantly related to oral morbidity measures. In general, for both age groups, the higher social class groups have a better oral health status.
2. The longer the respondent has resided in Canada the higher the DMF, but the fewer decayed teeth. This may be a reflection of the cultural differences in the immigrant groups with regard to diet and oral hygiene.
3. In terms of health belief variables perception of susceptibility, severity, preventability and mutability are related to many of the oral morbidity measures, although there were no differences in visiting behaviour. The more susceptible a respondent perceived himself to be, the poorer his oral health status actually was. Those who perceived dental conditions to be relatively severe had fewer decayed teeth and more filled teeth which may imply that this perception of severity resulted in their seeking dental attention.
4. All of the measures of perception of dental health and dental needs indicate that the adults are able to make a realistic appraisal of their oral health status. These realistic perceptions are not always translated into the appropriate action (i.e. seeking treatment).
5. With regard to motivational factors, it was found that a recall

system has a positive effect on oral health status.

6. Those who perceive dental services as unavailable have higher unmet needs. However, with the data available it is difficult to determine whether the perception causes inaction or whether experience causes the perception. Another measure of availability (i.e. difficulty in getting an appointment) indicated that there are fewer successfully filled teeth the more difficult it is to get an appointment.
7. Respondents have a poorer oral health status and make fewer dental visits if they perceive dental services to be inaccessible in that they have to wait too long.
8. Anticipated pain appears to be an important determining factor in that the more pain anticipated the worse the oral health and the fewer dental visits made.

PART V THE PROVIDERS OF DENTAL SERVICES

CHAPTER ONE
DENTISTS AND HYGIENISTS

Introduction

In Ontario, most dental services are provided by dentists themselves in private offices. However increasingly, a range of auxiliaries are taking a role in the delivery of services. These include dental assistants, dental technicians, denture therapists and dental hygienists. For the purposes of this report data were gathered on the demographic characteristics, the practice activities, and the attitudes of dentists and hygienists in selected Ontario communities toward dental providers, dental patients and dental services.

Demographic Characteristics

A random sample of dentists and hygienists was chosen from each of four centres in the study; that is, Toronto, Oshawa, Cornwall and Thunder Bay. An interviewer administered the questionnaire at a time and place convenient to the respondent.

Almost all of the dentists in the sample were male with a median age of 37.5 years. Approximately 77 percent of the dentists were Canadian-born and 88.9 percent were presently married.

As might be expected all of the hygienists in the sample were female with a median age of 26 years. The majority (81.8%) were born in Canada and were presently married (62.3%).

Practice Activities

Dentists

Of the dentists who responded to the questionnaire, 81.8 percent were in general dental practice. In terms of allocation of work time, a median of 34 hours per week was spent at the chair and one hour per week was spent doing other work. The median value for the number of dental visits in a week was 75.

With their practice activities in mind the dentists were asked to evaluate their work load. About 75 percent of the dentists said that patients waited less than four weeks for an appointment. Only 6.1 percent of respondents did not have some kind of recall system. Fifty percent of dentists, when asked to describe their practice, said all requesting appointments were given dental care and the dentist did not feel rushed or overworked. An additional 21 percent of respondents did feel rushed and overworked and 7.1 percent said they had time available.

Dentists were also asked to evaluate how their time is allocated among specific aspects of dental practice. The median values for each activity as a percentage of total time are as follows:

operative dentistry	44%
crown and bridge prosthesis	8%
oral diagnosis	5%
orthodontics	4%
prophylaxis	4%
periodontics	4%
partial denture prosthesis	4%
extraction	4%
complete denture prosthesis	3%

oral health education	2%
topical fluorides	1%
oral surgery	1%

In terms of work time, the median number of weeks worked is 47, with the median working day being 7.5 hours. About 52 percent of dentists work 5 days a week. As for income the median value is \$46,265. per year.

Hygienists

Of the hygienists who responded to the survey, the median number of years they had been working was four, and the average number of days worked per week was four. The median number of patients seen per month was 120. The average salary per day was \$69.45.

In terms of allocation of work time during the week, the median hours for specific activities were as follows:

scaling and polishing	12 hours
examinations	2 hours
topical fluorides	1 hour
oral health education	1 hour
oral health education planning	0 hours
application of medicines	0 hours

It is interesting to note the distribution between treatment oriented activities and educational activities.

Attitudes

Introduction

The dentist and hygienist questionnaires included a broad range of questions on attitudes toward the profession, feelings about patients and opinions about the delivery of dental services. For some items

data were available for both provider groups as well as consumers. The first category that will be discussed is attitudes toward the profession.

The Profession

General Issues

For the dentists two issues seem of paramount importance; namely, autonomy and payment mechanism. When asked about quality of care almost one-third (31.3%) of the dentists said that maximum possible autonomy for the individual dentist was absolutely essential for high quality care. In fact, 18.2 percent stated categorically that supervision of work by dental colleagues would be harmful. A further aspect of autonomy involves the use of auxiliaries. Almost all of the dentists (94%) expressed concern over being professionally accountable for a subordinate's performance.

In terms of a payment mechanism 34.3 percent felt that a fee for service system was absolutely essential and over half (54.5%) felt that being paid by salary was actually harmful to quality of care.

Level of Satisfaction

An important factor in describing the attitudes toward the profession is the level of satisfaction with one's situation and the perceived potential for change if not satisfied.

Tables 324 to 326 describes the general attitudes toward the profession toward advancement in the profession. Both dentists and hygienists feel that they have done at least as well as their colleagues in advancing in the profession. However, as Table 325 indicates, the majority of dentists feel that they have a great opportunity to

TABLE 324

DISTRIBUTION BY NUMBER AND PERCENT OF
HOW WELL RESPONDENT HAS DONE IN ADVANCEMENT IN THE PROFESSION
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Worse than average	1	1.3	5	5.1
Average	46	59.7	55	55.6
Better than average	20	26.0	37	37.4
DK	8	10.4	0	0.0
NA	2	2.6	2	2.0
Total	77	100.0	99	100.0

TABLE 325

DISTRIBUTION BY NUMBER AND PERCENT OF
OPPORTUNITIES TO ADVANCE IN PROFESSIONAL
STATUS FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Very good opportunity	25	32.5	63	63.6
Little opportunity	42	54.5	25	25.3
No opportunity	6	7.8	7	7.1
DK	4	5.2	2	2.0
NA	0	0.0	2	2.0
Total	77	100.0	99	100.0

TABLE 326

DISTRIBUTION BY NUMBER AND PERCENT OF
LIKELIHOOD OF ADVANCEMENT IN PROFESSIONAL STATUS FOR PROVIDERS,
ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Very likely	13	16.9	21	21.2
Somewhat likely	19	24.7	26	26.3
Not very likely	32	41.6	28	28.3
Not at all likely	3	3.9	10	10.1
Not interested	7	9.1	10	10.1
DK	2	2.6	2	2.0
NA	1	1.3	2	2.0
Total	77	100.0	99	100.0

advance whereas the majority of hygienists feel that there is little or no opportunity for advancement. These differences are not unexpected considering that these two dental professionals are not part of the same status hierarchy. Following from this, hygienists are much less optimistic about the likelihood of their advancement (Table 3).

Tables 327 and 328 describe two more general indicators of position within the profession. Dentists are more likely than hygienists to feel that they have kept up better than their colleagues in terms of technical advances. This may be because the body of knowledge that hygienists have access to is much more limited than that of the dentists.

Table 328 indicates that in general fewer hygienists than dentists feel that they are more likely to be doing work that interests them than their colleagues. This again may be a reflection of the more narrow scope of activities open to hygienists as opposed to dentists.

Table 329 shows the same pattern in that more dentists than hygienists feel that they are more satisfied with their work than their colleagues.

In terms of actually changing aspects of their practice, as Table 330 indicates, both dentists and hygienists feel that they would have a very good opportunity to change if they wanted to.

Table 331 shows the likelihood of hygienists changing to a field other than dentistry. Less than 30 percent are not interested in changing.

Table 332 also looks at changes but this time within dentistry. While almost 30 percent of both hygienists and providers feel that there are opportunities for them to become dental educators, 35.1 percent of hygienists and only 12.1 percent of dentists state that they are likely to make the change (Table 333).

TABLE 327

DISTRIBUTION BY NUMBER AND PERCENT OF
HOW WELL RESPONDENT HAS KEPT UP WITH TECHNICAL ADVANCES
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Worse than average	2	2.6	1	1.0
Average	51	66.2	46	46.5
Better than average	21	27.3	52	52.5
DK	2	2.6	0	0.0
NA	1	1.3	0	0.0
Total	77	100.0	99	100.0

TABLE 328

DISTRIBUTION BY NUMBER AND PERCENT OF
HOW WELL RESPONDENT HAS DONE
THE KIND OF DENTAL WORK THAT INTERESTS HIM/HER
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Worse than average	3	3.9	3	3.0
Average	37	48.1	41	41.4
Better than average	34	44.2	54	54.5
DK	2	2.6	0	0.0
NA	1	1.3	1	1.0
Total	77	100.0	99	100.0

TABLE 329

DISTRIBUTION BY NUMBER AND PERCENT OF
HOW WELL RESPONDENT HAS DONE GETTING SATISFACTION FROM WORK
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Worse than average	4	5.2	3	3.0
Average	33	42.9	36	36.4
Better than average	38	49.4	59	59.6
DK	1	1.3	0	0.0
NA	1	1.3	1	1.0
Total	77	100.0	99	100.0

TABLE 330

DISTRIBUTION BY NUMBER AND PERCENT OF
OPPORTUNITIES TO CHANGE JOB TO A FIELD
OTHER THAN DENTISTRY OR CHANGE THE KIND
OF PRACTICE FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Very good opportunity	31	40.3	37	37.4
Little opportunity	23	29.9	36	36.4
No opportunity	17	22.1	18	18.2
DK	4	5.2	4	4.0
NA	2	2.6	4	4.0
Total	77	100.0	99	100.0

TABLE 331

DISTRIBUTION BY NUMBER AND PERCENT OF
LIKELIHOOD OF CHANGING JOB TO A FIELD OTHER THAN DENTISTRY
FOR HYGIENISTS, ONTARIO SAMPLE, 1977

	Hygienists	
	N	%
Very likely	5	6.5
Somewhat likely	17	22.1
Not very likely	19	24.7
Not at all likely	13	16.9
Not interested	18	23.4
DK	4	5.2
NA	1	1.3
Total	77	100.0

TABLE 332

DISTRIBUTION BY NUMBER AND PERCENT OF
OPPORTUNITIES TO BECOME A DENTAL EDUCATOR
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Very good opportunity	25	32.5	29	29.3
Little opportunity	28	36.4	31	31.3
No opportunity	10	13.0	29	29.3
DK	5	6.5	0	0.0
NA	9	11.7	10	10.1
Total	77	100.0	99	100.0

TABLE 333

DISTRIBUTION BY NUMBER AND PERCENT OF
 LIKELIHOOD OF BECOMING A DENTAL EDUCATOR
 FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Very likely	8	10.4	4	4.0
Somewhat likely	19	24.7	8	8.1
Not very likely	22	28.6	26	26.3
Not at all likely	14	18.2	14	14.1
Not Interested	6	7.8	37	37.4
DK	1	1.3	2	2.0
NA	7	9.1	8	8.1
Total	77	100.0	99	100.0

a further perspective on satisfaction is to measure monetary rewards. For the hygienists 22.1 percent feel that they have done better than average financially whereas 38.4 percent of the dentists feel that way (Table 334). A majority in both provider groups feel that there is a very good opportunity to increase earnings. As Table 335 indicates, the dentists (62.6%) are more optimistic about this than are the hygienists (54.5%). However, according to Table 336 hygienists feel more confident in increasing their earnings than do dentists (42.9%).

Characteristics of a Practitioner

Providers and consumers presumably have a concept of the set of qualities necessary to make a good dental practitioner. Their points of view might be expected to differ as they have different kinds of information available to them. The qualities necessary can be grouped into specific technical dental skills, peripheral technical skills and interpersonal skills.

As Tables 337 and 338 indicate all three groups (hygienists, dentists and consumers) feel that technical dental skills; i.e., technical skill itself, and up to date information are extremely important for making a good dental practitioner. Other peripheral technical skills; namely, artistic ability and research ability are not seen as being as important by any of the groups (Tables 339 and 340). Administrative ability is considered necessary by dentists (Table 341).

Interpersonal skills, on the other hand, are seen as very necessary by the majority of the consumer and provider respondents (Tables 342 and 343),

TABLE 334

DISTRIBUTION BY NUMBER AND PERCENT OF
HOW WELL RESPONDENT HAD DONE FINANCIALLY
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Worse than average	6	7.8	9	9.1
Average	50	64.9	49	49.5
Better than average	17	22.1	38	38.4
DK	3	3.9	3	3.0
NA	1	1.3	0	0.0
Total	77	100.0	99	100.0

TABLE 335

DISTRIBUTION BY NUMBER AND PERCENT OF
OPPORTUNITIES TO INCREASE EARNINGS
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Very good opportunity	42	54.5	62	62.6
Little opportunity	27	35.1	33	33.3
No opportunity	4	5.2	3	3.0
DK	3	3.9	1	1.0
NA	1	1.3	0	0.0
Total	77	100.0	99	100.0

TABLE 336

DISTRIBUTION BY NUMBER AND PERCENT OF
LIKELIHOOD OF INCREASING EARNINGS
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Very likely	33	42.9	32	32.3
Somewhat likely	25	32.5	35	35.4
Not very likely	10	13.0	19	19.2
Not at all likely	4	5.2	5	5.1
Not interested	1	1.3	4	4.0
DK	3	3.9	2	2.0
NA	1	1.3	2	2.0
Total	77	100.0	99	100.0

TABLE 337

DISTRIBUTION BY NUMBER AND PERCENT OF
NECESSITY FOR TECHNICAL SKILL IN MAKING A GOOD DENTAL PRACTITIONER
FOR PROVIDERS AND CONSUMERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists		Consumers	
	N	%	N	%	N	%
Absolutely necessary	56	72.7	48	48.5	720	63.0
Very necessary	19	24.7	44	44.4	370	32.4
Somewhat necessary	1	1.3	6	6.1	32	2.8
Not very necessary	0	0.0	1	1.0	9	0.8
DK	1	1.3	1	1.0	9	0.8
NA	0	0.0	0	0.0	3	0.3
Total	77	100.0	99	100.0	1143	100.0

TABLE 338

DISTRIBUTION BY NUMBER AND PERCENT OF
NECESSITY OF UP TO DATE INFORMATION
IN MAKING A GOOD DENTAL PRACTITIONER
FOR PROVIDERS AND CONSUMERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists		Consumers	
	N	%	N	%	N	%
Absolutely necessary	39	50.6	49	49.5	837	73.2
Very necessary	30	39.0	44	44.4	260	22.7
Somewhat necessary	7	9.1	0	0.0	25	2.2
Not very necessary	0	0.0	0	0.0	11	1.0
DK	1	1.3	0	0.0	7	0.6
NA	0	0.0	6	6.1	3	0.3
Total	77	100.0	99	100.0	1,143	100.0

TABLE 339

DISTRIBUTION BY NUMBER AND PERCENT OF
NECESSITY FOR ARTISTIC ABILITY IN MAKING A GOOD DENTAL PRACTITIONER
FOR PROVIDERS AND CONSUMERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists		Consumers	
	N	%	N	%	N	%
Absolutely necessary	3	3.9	9	9.1	226	19.8
Very necessary	12	15.6	48	48.5	394	34.5
Somewhat necessary	38	49.4	36	36.4	297	26.0
Not very necessary	21	27.3	6	6.1	199	17.4
DK	3	3.9	0	0.0	24	2.1
NA	0	0.0	0	0.0	3	0.3
Total	77	100.0	99	100.0	1,143	100.0

TABLE 340

DISTRIBUTION BY NUMBER AND PERCENT OF
NECESSITY FOR RESEARCH ABILITY
IN MAKING A GOOD DENTAL PRACTITIONER
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Absolutely necessary	1	1.3	2	2.0
Very necessary	17	22.1	9	9.1
Somewhat necessary	39	50.6	28	28.3
Not very necessary	19	24.7	60	60.6
DK	1	1.3	0	0.0
NA	0	0.0	0	0.0
Total	77	100.0	99	100.0

TABLE 341

DISTRIBUTION BY NUMBER AND PERCENT OF
NECESSITY OF ADMINISTRATIVE ABILITY FOR A GOOD PRACTITIONER
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Absolutely necessary	4	5.2	13	13.1
Very necessary	15	19.5	51	51.5
Somewhat necessary	41	53.2	32	32.3
Not very necessary	16	20.8	2	2.0
DK	1	1.3	1	1.0
NA	0	0.0	0	0.0
Total	77	100.0	99	100.0

TABLE 342

DISTRIBUTION BY NUMBER AND PERCENT OF
NECESSITY FOR ABILITY TO HANDLE PEOPLE
IN MAKING A GOOD DENTAL PRACTITIONER
FOR PROVIDERS AND CONSUMERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists		Consumers	
	N	%	N	%	N	%
Absolutely necessary	54	70.1	53	53.5	594	52.0
Very necessary	21	27.3	41	41.4	442	38.7
Somewhat necessary	1	1.3	5	5.1	83	7.3
Not very necessary	0	0.0	0	0.0	18	1.6
DK	1	1.3	0	0.0	3	0.3
NA	1	1.3	0	0.0	3	0.3
Total	77	100.0	99	100.0	1,143	100.0

TABLE 343

DISTRIBUTION BY NUMBER AND PERCENT OF
NECESSITY FOR A PLEASING PERSONALITY FOR A GOOD PRACTITIONER
FOR PROVIDERS, ONTARIO SMAPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Absolutely necessary	34	44.2	29	29.3
Very necessary	31	40.3	59	59.6
Somewhat necessary	11	14.3	11	11.1
Not very necessary	0	0.0	0	0.0
DK	1	1.3	0	0.0
NA	0	0.0	0	0.0
Total	77	100.0	99	100.0

The Patients

The provision of dental services implies some form of interaction between the dentist and the consumer. Each participant, then, is in a position to evaluate the quality of that interaction from the perspective of his/her own values, attitudes and knowledge base. The assessment of the practitioner was made under the following general categories sensitivity of dentist, competency of dentist and availability of dentist.

Sensitivity of Dentist

Sensitivity of the dentist was operationalized by dentists taking an interest in their patients, remembering them, explaining their problems to them and trying not to cause them pain.

As Table 344 indicates consumers are less likely than the providers to feel that dentists take an interest in their patients. A less distinct pattern is found for dentists remembering their patients (Table 345). What may be occurring is that dentists think they are communicating their interest to the patients but the patients may not be interpreting it as such. Likewise, dentists and patients may have different criteria for "interest".

When sensitivity of the dentist to the patient is operationalized by whether a practitioner explains a patient's problem, some patients feel that this happens more often than does the dentist (Table 346). This discrepancy in opinion can probably be accounted for by different knowledge levels. Although the patients feel satisfied with the explanations they have been given, the dentist would know when the

TABLE 344

DISTRIBUTION BY NUMBER AND PERCENT OF
WHETHER DENTISTS TAKE AN INTEREST IN THEIR PATIENTS
FOR PROVIDERS AND CONSUMERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists		Consumers	
	N	%	N	%	N	%
Almost never true	0	0.0	0	0.0	32	2.8
Seldom true	3	3.9	0	0.0	131	11.5
Often true	25	32.5	23	23.2	465	40.7
Almost always true	39	50.6	62	62.6	491	43.0
Always true	6	7.8	13	13.1	-	-
DK	4	5.2	0	0.0	19	1.7
NA	0	0.0	1	1.0	5	0.4
Total	77	100.0	99	100.0	1,143	100.0

TABLE 345

DISTRIBUTION BY NUMBER AND PERCENT OF
WHETHER DENTISTS FORGET ABOUT THEIR PATIENTS
FOR PROVIDERS AND CONSUMERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists		Consumers	
	N	%	N	S	N	%
Almost never true	1	1.3	9	9.1	260	22.7
Seldom true	34	44.2	59	59.6	366	32.0
Often true	31	40.3	28	28.3	318	27.8
Almost always true	3	3.9	1	1.0	155	13.6
Always true	2	2.6	0	0.0	-	-
DK	6	7.8	1	1.0	38	3.3
NA	0	0.0	1	1.0	6	0.5
Total	77	100.0	99	100.0	1,143	100.0

TABLE 346

DISTRIBUTION BY NUMBER AND PERCENT OF
WHETHER DENTISTS EXPLAIN PROBLEMS
FOR PROVIDERS AND CONSUMERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists		Consumers	
	N	%	N	%	N	%
Almost never true	0	0.0	0	0.0	38	3.3
Seldom true	5	6.5	7	7.1	89	7.8
Often true	30	39.0	40	40.4	335	29.3
Almost always true	29	37.7	40	40.4	652	57.0
Always true	10	13.0	9	9.1	-	-
DK	3	3.9	2	2.0	15	1.3
NA	0	0.0	1	1.0	14	1.2
Total	77	100.0	99	100.0	1,143	100.0

explanation could have been more detailed.

In terms of pain (Table 347), the majority of both dentists and consumers feel that it is almost always true that dentists try not to cause pain. Hygienists, on the other hand, feel that it is "often true", but not "almost always".

Competency of Dentist

As professionals, dentists have monopolistic control over an abstract body of knowledge. Consumers, therefore, have no special knowledge which would allow them to judge the competency of a dentist the way a practitioner could judge a peer. Nevertheless, the opinions of the consumers and the providers are remarkably similar in Table 348 despite the fact that each group would be using different criteria in their evaluation of competency.

A further perspective on competency is whether dentists recommend more things to be done than need to be done (Table 349). Consumers feel that this happens more frequently than do dentists. Again this could be because the patient does not have the same level of understanding of the complexity of his/her problem or the treatment alternatives as the dentist does.

Table 350 indicates that many dentists believe that dentists prefer treatment over prevention whereas consumers perceive that the preference is not as strong.

Availability of Dentists

An important issue to consider in the use of dental health services is the actual and perceived availability of dentists. According to Table 351 consumers are less optimistic about the availability of dentists

TABLE 347

DISTRIBUTION BY NUMBER AND PERCENT OF
WHETHER DENTISTS TRY NOT TO CAUSE PAIN
FOR PROVIDERS AND CONSUMERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists		Consumers	
	N	%	N	%	N	%
Almost never true	2	2.6	1	1.0	48	4.2
Seldom true	6	7.8	2	2.0	60	5.2
Often true	52	67.5	41	41.4	317	27.7
Almost always true	14	18.2	54	54.5	694	60.7
Always true	0	0.0	0	0.0	-	-
DK	3	3.9	0	0.0	17	1.5
NA	0	0.0	1	1.0	7	0.6
Total	77	100.0	99	100.0	1,143	100.0

TABLE 348

DISTRIBUTION BY NUMBER AND PERCENT OF
WHETHER DENTISTS ARE COMPETENT OR NOT
FOR PROVIDERS AND CONSUMERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists		Consumers	
	N	%	N	%	N	%
Almost never true	0	0.0	0	0.0	9	0.8
Seldom true	2	2.6	0	0.0	38	3.3
Often true	24	31.2	23	23.2	373	32.6
Almost always true	41	53.2	67	67.7	696	60.9
Always true	7	9.1	6	6.1	-	-
DK	3	3.9	2	2.0	19	1.7
NA	0	0.0	1	1.0	8	0.7
Total	77	100.0	99	100.0	1,143	100.0

TABLE 349

DISTRIBUTION BY NUMBER AND PERCENT OF
WHETHER DENTISTS RECOMMEND MORE THINGS TO BE DONE
FOR CONSUMERS AND PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists		Consumers	
	N	%	N	%	N	%
Almost never true	6	7.8	10	10.1	288	25.2
Seldom true	46	59.7	75	75.8	460	40.2
Often true	16	20.8	9	9.1	229	20.2
Almost always true	3	3.9	1	1.0	123	10.8
Always true	0	0.0	0	1.0	-	-
DK	6	7.8	3	3.0	37	3.2
NA	0	0.0	1	1.0	6	0.5
Total	77	100.0	99	100.0	1,143	100.0

TABLE 350

DISTRIBUTION BY NUMBER AND PERCENT OF
DENTISTS' PREFERENCE FOR TREATMENT OVER PREVENTION
FOR CONSUMERS AND PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists		Consumers	
	N	%	N	%	N	%
Almost never true	4	5.2	3	3.0	323	28.3
Seldom true	35	45.5	27	27.3	402	35.2
Often true	23	29.9	54	54.5	234	20.5
Almost always true	7	9.1	14	14.1	145	12.7
Always true	2	2.6	0	0.0	-	-
DK	6	7.8	0	0.0	32	2.8
NA	0	0.0	1	1.0	7	0.6
Total	77	100.0	99	100.0	1,143	0.0

TABLE 351

DISTRIBUTION BY NUMBER AND PERCENT OF
AVAILABILITY OF DENTISTS WHEN YOU NEED THEM
FOR PROVIDERS AND CONSUMERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists		Consumers	
	N	%	N	%	N	%
Almost never true	0	0.0	0	0.0	160	14.0
Seldom true	12	15.6	6	6.1	209	18.3
Often true	29	37.7	37	37.4	334	29.2
Almost always true	25	32.5	44	44.4	404	35.3
Always true	5	6.5	7	7.1	-	-
DK	4	5.2	4	4.0	27	2.4
NA	2	2.6	1	1.0	9	0.8
Total	77	100.0	99	100.0	1,143	100.0

compared to 1 percent of dentists. Because of the colleague network and professional courtesy, it would be expected that dentists would not have any trouble contacting a dentist if they needed one. Likewise, dentists may feel that they are available to their patients at any time, yet their receptionists are the ones in many cases, that evaluate the patient's need to see the dentist.

Table 352 measures availability more generally. It would appear that patients are more likely to feel dentists can select their patients. Likewise Table 353 indicates that providers feel that dentists do not always practice where they are needed.

Just as opinions are formulated about the practitioner in dentist-patient interactions, opinions are also formulated about the patient.

Opinions About Consumers

As Table 354 indicates neither hygienists nor dentists are very confident about patients following advice on personal oral hygiene.

As has been mentioned in previous chapters pain is an important component in deterring use of dental services. The majority of providers in both groups feel that patients do fear pain (Table 355). Dentists, in particular feel that some of this fear is directed toward practitioners (Table 356) although hygienists do not share their view.

Table 357 indicates that neither hygienitst nor dentists feel that patients complain too much about waiting. This, of course, does not imply that patients are satisfied with the amount of time they have to wait, but rather that they don't complain.

On the other side, providers feel that most patients do keep their appointments (Table 358). However, 30 percent of hygienists

TABLE 352

DISTRIBUTION BY NUMBER AND PERCENT OF
WHETHER DENTISTS CAN SELECT PATIENTS
FOR PROVIDERS AND CONSUMERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists		Consumers	
	N	%	N	%	N	%
Almost never true	1	1.3	2	2.0	352	30.8
Seldom true	22	28.6	33	33.3	302	26.4
Often true	24	31.2	42	42.4	241	21.1
Almost always true	21	27.3	14	14.1	143	12.5
Always true	5	6.5	6	6.1	-	-
DK	4	5.2	1	1.0	96	8.4
NA	0	0.0	1	1.0	9	0.8
Total	77	100.0	99	100.0	1,143	100.0

TABLE 353

DISTRIBUTION BY NUMBER AND PERCENT OF
WHETHER DENTISTS PRACTICE WHERE THEY ARE NEEDED
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Almost never true	1	1.3	6	6.1
Seldom true	32	41.6	26	26.3
Often true	24	31.2	39	39.4
Almost always true	10	13.0	20	20.2
Always true	6	7.8	4	4.0
DK	4	5.2	2	2.0
NA	0	0.0	2	2.0
Total	77	100.0	99	100.0

TABLE 354

DISTRIBUTION BY NUMBER AND PERCENT OF
WHETHER PATIENTS DON'T FOLLOW ADVICE ON PERSONAL ORAL HYGIENE
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Almost never true	0	0.0	1	1.0
Seldom true	15	19.5	20	20.2
Often true	49	63.6	68	68.7
Almost always true	10	13.0	9	9.1
Always true	1	1.3	0	0.0
DK	1	1.3	0	0.0
NA	1	1.3	1	1.0
Total	77	100.0	99	100.0

TABLE 355

DISTRIBUTION BY NUMBER AND PERCENT OF
WHETHER PATIENTS FEAR PAIN
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Never true	1	1.3	3	3.0
Seldom true	4	5.2	20	20.2
Often true	35	45.5	41	41.4
Almost always true	25	32.5	24	24.2
Always true	10	13.0	10	10.1
DK	1	1.3	1	1.0
NA	1	1.3	0	0.0
Total	77	100.0	99	100.0

TABLE 356

DISTRIBUTION BY NUMBER AND PERCENT OF
PATIENTS FEARING PRACTITIONERS
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Never true	3	3.9	3	3.0
Seldom true	43	55.8	36	36.4
Often true	23	29.9	48	48.5
Almost Always true	6	7.8	11	11.1
Always true	0	0.0	1	1.0
DK	1	1.3	0	0.0
NA	1	1.3	0	0.0
Total	77	100.0	99	100.0

TABLE 357

DISTRIBUTION BY NUMBER AND PERCENT OF
WHETHER PATIENTS TEND TO COMPLAIN TOO MUCH ABOUT WAITING
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Never True	27	35.1	26	26.3
Seldom true	35	45.5	60	60.6
Often true	9	11.7	13	13.1
Almost always true	3	3.9	0	0.0
Always true	0	0.0	0	0.0
DK	1	1.3	0	0.0
NA	2	2.6	0	0.0
Total	77	100.0	99	100.0

TABLE 358

DISTRIBUTION BY NUMBER AND PERCENT FOR
PATIENTS WHO DON'T KEEP APPOINTMENTS
FOR PROVIDERS, ONTARIO SAMPLE, 1977

	Hygienists		Dentists	
	N	%	N	%
Never true	1	1.3	3	3.0
Seldom true	50	64.9	79	79.8
Often true	19	24.7	16	16.2
Almost always true	4	5.2	1	1.0
DK	1	1.3	0	0.0
NA	2	2.6	0	0.0
Total	77	100.0	99	100.0

and 17 percent of dentists feel that patients often break their appointments.

As far as consumers recognizing the need for practitioners, Table 359 indicates that about 20 percent of hygienists feel patients see no need for hygienists, the majority having more positive feelings.

Delivery of Dental Services

Third-party payment systems are becoming an increasingly important component in the delivery of dental services in Ontario. It is reasonable to assume that such systems have implications for the quality and quantity of service delivery. Dentists were asked their opinion of third party payment systems in terms of creating administrative problems, affecting utilization, affecting treatment and affecting autonomy.

Administrative

As Table 360 indicates, 77.8 percent of the dentists felt that third party systems created administrative problems, including too much paper work.

Utilization

As for the affect on utilization (Table 361) dentists overwhelmingly felt that these systems increase the use of services by the lower income groups (90.8%). In addition, most dentists felt that their practice, in general, had expanded as a result of third party payment (77.8%). However, 76.8 percent did not feel that third party systems caused over-utilization.

TABLE 359

DISTRIBUTION BY NUMBER AND PERCENT OF
WHETHER PATIENTS CONSIDER NO NEED FOR HYGIENISTS
ONTARIO SAMPLE, 1977

	Hygienists	
	N	%
Never true	13	16.9
Seldom true	46	59.7
Often true	15	19.5
Almost always true	0	0.0
Always true	0	0.0
DK	2	2.6
NA	1	1.3
Total	77	100.0

TABLE 360

DISTRIBUTION BY NUMBER AND PERCENT OF
THIRD PARTY PAYMENT SYSTEMS CREATING
ADMINISTRATIVE PROBLEMS FOR DENTISTS
ONTARIO SAMPLE, 1977

	N	%
Never true	2	2.0
Seldom true	19	19.2
Often true	37	37.4
Almost always true	22	22.2
Always true	18	18.2
DK	1	1.0
NA	0	0.0
Total	99	100.0

TABLE 361

DISTRIBUTION BY NUMBER AND PERCENT OF
THIRD PARTY SYSTEMS AFFECTING
UTILIZATION FOR DENTISTS
ONTARIO SAMPLE, 1977

	Increase Service Available to Low Income Groups		Expand a Dentist's Practice		Cause Over- Utilization by Subscribers	
	N	%	N	%	N	%
Never true	2	2.0	2	2.0	18	18.2
Seldom true	7	7.1	18	18.2	58	58.6
Often true	34	34.3	40	40.4	16	16.2
Almost always true	33	33.3	25	25.3	2	2.0
Always true	23	23.2	12	12.1	1	1.0
DK	0	0.0	2	2.0	4	4.0
NA	0	0.0	0	0.0	0	0.0
Total	99	100.0	99	100.0	99	100.0

Treatment

In terms of the effect on the quality and quantity of treatment, (Table 362) only 19.2 percent of the dentists feel that third party payment causes over-utilization. However, 35.3 percent feel that such a payment system prevents adequate diagnosis and treatment because of coverage limitations. Although 60.6 percent feel that these systems do not set high dental standards, 70.8 percent feel that the system does promote preventive dentistry.

Autonomy

As Table 363 indicates, 24.2 percent of dentists feel that third party systems affect their autonomy by interfering with fee setting. By the same token 31.2 percent feel that, in general, their professional freedom is interfered with by third party payment systems.

TABLE 362

DISTRIBUTION BY NUMBER AND PERCENT OF
THIRD PARTY PAYMENT SYSTEMS AFFECTING QUALITY AND TYPE OF TREATMENT
FOR DENTISTS, ONTARIO SAMPLE, 1977

	Cause Over- Treatment		Prevent Adequate Diagnosis and Treatment		Help Promote Preventive Dentistry		Set High Dental Standards	
	N	%	N	%	N	%	N	%
Never true	16	16.2	11	11.1	7	7.1	16	16.2
Seldom true	61	61.6	49	49.5	22	22.2	44	44.4
Often true	16	16.2	30	30.3	46	46.5	24	24.2
Almost always true	3	3.0	4	4.0	17	17.2	6	6.1
Always true	0	0.0	1	1.0	7	7.1	2	2.0
DK	1	1.0	3	3.0	0	0.0	7	7.1
NA	2	2.0	1	1.0	0	0.0	0	0.0
Total	99	100.0	99	100.0	99	100.0	99	100.0

TABLE 363

DISTRIBUTION BY NUMBER AND PERCENT OF
THIRD PARTY PAYMENT SYSTEMS AFFECTING AUTONOMY
FOR DENTISTS, ONTARIO SAMPLE, 1977

	Interfere With Fees		Interfere With Professional Freedom	
	N	%	N	%
Never true	20	20.2	16	16.2
Seldom true	49	49.5	49	49.5
Often true	17	17.2	24	24.2
Almost always true	4	4.0	3	3.0
Always true	3	3.0	4	4.0
DK	5	5.1	1	1.0
NA	1	1.0	2	2.0
Total	99	100.0	99	100.0

A STUDY OF DENTAL MANPOWER SYSTEMS
IN RELATION TO ORAL HEALTH STATUS
PART I - ONTARIO

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SUMMARY

An extension of the International Collaborative Study (I.C.S.) of dental manpower systems in relation to oral health has been completed in the Province of Ontario, Canada, using a format similar to that used in the original five countries, Australia, the Federal Republic of Germany, Japan, New Zealand and Norway and subsequently in Baltimore, in the United States (Barmes, 1976, Møller and Beck, 1976, Slater and Shuval, 1976, Bonito, 1976). The countries were chosen because of differences in the nature of the dental services. In Australia, services are delivered mainly by dentists on a fee-for-service basis, there is little dental insurance and 50 percent of the population drinks fluoridated water. The Federal Republic of Germany delivers services through private practitioners on a fee-for-service basis. Ninety-seven percent of the population has compulsory dental health insurance. There is a school examination and referral service. Fluoridated water supplies are scarce. Japan also delivers most services through private dental offices. Ninety-five percent of the population has some form of dental health insurance. A large number of dental hygienists work in the system. There is a school dental examination. Less than 1 percent of the population is served by fluoridated water. Norway has a low dentist to population ratio

1:1090, and very few hygienists. Sixty percent of dentists are in private practice working on a fee-for-service basis. The remainder work for School Dental Service or Public Dental Service which provides free dental services to children 7 to 14 and 6 to 20 years of age respectively. No water fluoridation exists in Norway. Widespread topical and systemic (tablets) fluoride is used. New Zealand has a free dental care system for children 2.5 to 13 years of age staffed by operating school dental nurses and for children 14 to 16 provided by dentists in private offices. Fifty percent of the population consumes fluoridated water. The United States delivers services mainly on a fee-for-service basis by private dental practitioners and dental hygienists. Fifteen percent has some prepaid dental coverage. Half of the population drinks fluoridated water.

Important characteristics of Ontario dental services which can be compared to those of the above countries are described briefly.

Ontario, the second largest Canadian Province, had 8,264,465 people in 1976 or 36 percent of the nation's population. The per capita income in 1975 was \$6,431. The majority of oral health services are provided on a direct fee-for-service basis. Government financed dental treatment services are available to the armed forces and welfare recipients. The local municipalities and regional authorities administer some dental education, prevention and referral services for school children. Some cities also provide dental treatment services for school children. Twenty-nine percent of the population has dental health insurance. Fluoridated water supplies reach 62.3 percent of the population (Bowen, 1977). Two dental schools graduate 177 dentists annually. In 1977, Ontario had

3,949 dentists for a dentist population ratio of 1:2093 (Proceedings R.C.D.C. 1977). Ten percent of dentists were specialists. The dentists routinely have one or more dental chairside assistants. There were 1,041 dental hygienists of the traditional North American type whose work is of a preventive nature and 342 denture therapists who can make full dentures without supervision by the dentist. In general, most features of the Ontario, Canada system of dental care are similar to those of Japan and the United States. The system uses more dental auxiliaries than Australia, Norway or Germany. It does not have government financed, comprehensive, dental care for children like Norway and New Zealand or a universal, dental, National Health Insurance system like the Federal Republic of Germany. Seventy-one percent of students and 53.5 percent of adults had visited the dentist in the previous year.

The study was designed to obtain information about the dental health status of the population of Ontario as related to the structure of the dental care delivery system. In addition, the survey would define and analyze the interrelationships of the characteristics of consumers, providers and the system itself.

Briefly, the oral health survey measured periodontal disease, dental caries, dento-facial anomalies, prosthetic status and oral pathology in groups of children and adults. Treatment requirements were estimated and recorded for each condition. Questionnaires for the older students and adults obtained information on their attitudes to general and oral health services, their past behaviour with respect to oral health and their perception of the accessibility and acceptability of dental services. The providers of services, the dentists and

hygienists, were interviewed to determine their attitudes toward their work and their patients and to assess the economics and productivity of their practices.

The study sample consisted of 1,124, 8 and 9 year old children, 936 13 and 14 year old children, 441 25 to 34 year old adults and 702, 35 to 44 year old adults, 99 dentists and 77 hygienists.

The sample was drawn from four regions in Ontario; Cornwall, Oshawa, Toronto and Thunder Bay and their surrounding communities. The water supplies of the first three areas had been fluoridated for at least 15 years.

The children were chosen by a random selection of classes in the appropriate grade level. Eighty-nine percent were born in Canada.

The adults were chosen by computer selection from population registers. Fifty-nine percent were born in Canada.

Oral Health Variables

The present state of oral health in the categories of dental caries; periodontal disease, orthodontic and other anomalies, denture and bridge possession, and oral pathology are described briefly for each age group and where possible compared to data from Canada and the other I.C.S. countries. Treatment needs are also tabulated.

Description of Oral Health Variables Children 8-9 Years of Age

1. Dental Caries

The caries prevalence for primary teeth of the 8 and 9 year old children is shown in figure 1. The average number of primary decayed (d)

missing due to caries (m) and filled (f) teeth (dmft) was 3.1 of which 1.2 were decayed, 0.2 were missing and 1.7 were filled. The average number of permanent decayed (D), missing (M) and filled (F) teeth (DMFT) was 1.5 (figure 2). The components were 0.7 decayed, 0 missing, and 0.8 filled. These were the second lowest primary and permanent dmft, DMF tooth scores in the International group surpassed only by Baltimore (U.S.A.).

Fluoride was found to reduce the amount of dental caries. Children born in a fluoride area had 0.7 d, 0.16 m, 1.70 f = 2.56 dmft primary teeth. Children born in non-fluoride areas had 1.20 d, 0.38 m, 1.92 f, = 3.49 dmft teeth. The permanent teeth DMF index in the fluoride area was 0.53 D, 0.01 M and 0.74 F = 1.25 DMF teeth. In the non-fluoride area it was 0.79 D, 0.07 M, 1.06 F = 1.90 DMF teeth.

2. Periodontal Health

The number of permanent teeth was	13.11
The number of teeth with gingivitis was	3.75
The Debris Index was	0.94
The Calculus Index was	0.02
The Oral Hygiene Index was	0.96
The Periodontal Index was	0.31

In comparison with the I.C.S. countries and the U.S.A., Canada had the lowest scores in all of the periodontal related indices except the Oral Hygiene Index in which Baltimore, U.S.A. had a lower score of 0.85.

3. Treatment Requirements

The average 8-9 year old child had 1.4 teeth, primary or permanent, which required restoration, somewhat less than the 2.2 restorations needed per child 8-10 years of age in the Nutrition Canada Survey (1977).

There were some other indicators of the relatively good state of dental health of Ontario 8-9 year old children.

56.7 percent had no decayed primary teeth.

66.4 percent had no decayed permanent teeth.

48.8 percent had neither decayed primary teeth nor decayed permanent teeth.

26.8 percent had no dmf teeth and

39.4 percent had no DMF teeth.

Students 13-14 Years of Age

1. Dental Caries

For the 13 and 14 year old students, the average DMF tooth score was 4.35 composed of 1.01 decayed, 0.15 missing and 3.10 filled teeth (figure 3). In comparison with the I.C.S. countries, Ontario had the second lowest caries prevalence after Baltimore in the United States.

Much of the low caries prevalence can be related to fluoridated water supplies. The 13 and 14 year old students who were born and resided at least 5 years in a fluoride area had an average of 3.7 DMF teeth. Those born and raised in a non-fluoride area had 4.9 DMF teeth (Table 1). In Table 2, which is a display of DMF scores by geographical region within Ontario, it is very apparent that children in the regions supplied by fluoridated water have fewer DMF teeth (range 3.1 to 3.9) than those in non-fluoridated communities (range 5.1 to 6.5).

The DMF tooth score of male students was 4.0 and of the female students, 4.6. The metropolitan students had 4.0 DMF teeth and the non-metropolitan students had 5.0.

2. Periodontal Health

The number of permanent teeth present was	26.9
The number of teeth with gingivitis was	6.5
The Debris Index was	0.7
The Calculus Index was	0.1
The Oral Hygiene Index was	0.8
the Periodontal Index was	0.3

These indices are low compared to those of the International Collaborative Study students. Figure 4

3. Anomalies, Space and Occlusion - Several different assessments

were made of dental anomalies, space and occlusion as a basis for an estimate of treatment needs.

a) Dentofacial Anomalies

The most apparent anomalies were missing teeth (19 percent of the sample) and retained teeth (7.1 percent of the sample) (Table 3).

b) Space

Thirty point two percent of the students had irregular anterior teeth and 28.1 percent had crowded teeth (Table 1b). Half that number had measurable spaces in the arch (17.6 percent) or a diastema (14.1 percent). The latter condition caused concern about their appearance among some of the students.

c) Occlusion

Among the measures of occlusion, some departure from a normal anteroposterior molar relationship (35.7 percent) and deviation of the mid-line (2.15 percent) were the most common followed by posterior crossbite (19.4 percent)

overbite (16.3 percent) and overjet (15.1 percent).

4. Treatment Requirements

Fifty-two percent of the sample needed oral hygiene instruction, 55 percent required plaque removal and/or minor scaling and only 3 percent needed major scaling.

For caries related conditions, 49.7 percent of students did not require restorations and 95.3 percent had 1.23 teeth which required restoration and 0.01 teeth in need of extraction. The Nutrition Canada study stated that 0.9 restorations were needed per person 12-14 years of age.

In terms of orthodontic treatment required, 25.4 percent needed corrective treatment and 8.0 percent needed preventive care. Two percent had the treatment completed and treatment was in progress for 8.9 percent. However, 26.4 percent were in need of treatment.

5. Treatment Need Ratio

Some characteristics of each dental care system are shown in figure 5. Eighty seven percent of the Ontario students' need for treatment had been met successfully. The treatment-to-need ratio was better than those of Australia, Baltimore (U.S.A.), Germany and Japan but not as good as those of Norway and New Zealand. The retreatment need, expressed as a ratio to treatment provided, was 6 percent.

The Adult Samples, 25-34 and 35-44 Years of Age

A 35-44 year age group was included in the Ontario sample similar to the I.C.S. grouping. An additional 25-34 year age group was considered separately in the Ontario Study.

1. Dental Caries

The 25-34 year old adults had 0.9 decayed (D) 4.0 missing (M) and 8.9 filled (F) teeth and 13.8 DMF teeth. Nutrition Canada adults, average age 30 years, had 15.6 DMF teeth.

The 35-44 year old adults had 0.8 decayed, 7.8 missing and 7.8 filled teeth and 16.4 DMF teeth. This group can be compared with the other I.C.S. country adults for both the total sample and the dentate sample (Figure 6). The Ontario dentate adults were most like the Baltimore, U.S.A. adults. Japanese adults had a much lower DMF index and Australian, Norwegian and New Zealand adults had much higher DMF indices.

Ontario has had a large influx of immigrants in the last 30 years. It is interesting to note that the adults who have lived in Ontario for more than 20 years (mostly native born Canadians) had almost one-third more DMF teeth than the immigrants who arrived after that time (Table 4). Adults in the metropolitan sample had significantly fewer missing teeth than those in the non-metropolitan area (Table 5). The difference was 3.5 missing teeth for both adult age groups.

2. Periodontal Health

For 25-34 year old dentate adults:

the number of permanent teeth was	26.2
the number of teeth with gingivitis was	10.8
the Debris Index was	0.67
the Calculus Index was	0.63
the Oral Hygiene Index was	1.30
the Periodontal Index was	0.67

For 35-44 year old dentate adults:

the number of permanent teeth was	22.97
the number of teeth with gingivitis was	10.28
the Debris Index was	0.72
the Calculus Index was	0.85
the Oral Hygiene Index was	1.44
the Periodontal Index was	0.96

The 35-44 year old adults periodontal health indicators can be compared to the I.C.S. country adult data. The number of teeth with gingivitis in Ontario was lower than that of the Australian adults, the lowest in the I.C.S. group (10.94). The debris index fell in the lower range of the I.C.S. countries (range 0.66 - 1.18);

the Calculus Index was in the middle range	(range 0.22 - 1.01)
the Oral Hygiene Index was in the middle range	(range 0.82 - 2.16)
the Periodontal Index was the lowest	(range 1.08 - 2.15)

3. Edentulousness

At 25 to 34 years of age, 2.9 percent of the Ontario adults were edentulous in both jaws and 5.4 percent in one jaw (Table 6). At ages 35 to 44 years, 8.7 percent of adults were edentulous in both jaws and an additional 11.5 percent were edentulous only in one jaw.

In the I.C.S. countries, percentages of the sample of 35-44 year old adults who were completely edentulous were: Japan 0.0, Federal Republic of Germany 1.6, Norway 6.4, (Ontario 8.7) U.S.A. 10.6, Australia 13.2 and New Zealand 35.7.

4. Prosthetic Requirements and Treatment

The two adult age group samples have been summarized for full and partial denture and bridge possession and need under the categories; have no dentures or bridges need none, have none need some, have some

need none, have some need some (Table 7). The data for the 35 to 44 year old group can be compared to similar data presented by Barmes in 1976 at Athens for the original study countries. Ontario adults have a fairly high unmet need for new dentures at 17.7 per cent of the sample (similar to Australia, New Zealand and West Germany). The unmet need for bridges at 32.3 per cent of the sample, is higher than any of the other countries. However, New Zealand in particular seems to have met the missing tooth replacement need with dentures as opposed to bridges (Barmes, 1976).

Factors Affecting Oral Health Status

The structure of a system for the delivery of dental health services influences the oral health status of the population. The International Collaborative Study was designed to investigate the impact of different structural characteristics of the delivery system on oral health status. The major components of structure were stated to be availability, accessibility and acceptability. An hypothesis was advanced that the more available accessible and acceptable the oral care provided to the population, the more positive the effect on that population's oral health.

The International Collaborative Study Countries represented different combinations of structural characteristics in terms of:

- a. the type of provider employment in private practices, public service or a combination of the two,
- b. the types of providers; consisting of dentists or dentists and operating auxiliaries,
- c. payment mechanisms which may be fee-for-service, third party insurance or government controlled insurance and
- d. the population served; that is, whether or not services are designated for a target group such as children or pensioners.

Enabling Factors

The enabling factors of the Ontario system, i.e. the availability of services in Ontario and their effects on dental health can be described in several ways.

Availability of Dental Services

Availability of services in different countries is thought by many to depend on the dentist to population ratio. Ontario, with a ratio of 1:2093 compares favourably with the other countries in the ICS study. The distribution of dentist manpower in the metropolitan and non-metropolitan regions of the study sites in the Ontario survey is uneven.

Metropolitan Toronto		1:1461
Thunder Bay	Metro	1:1938
	Non-Metro	1:2204
Oshawa	Metro	1:2143
	Non-Metro	1:2643
Cornwall	Metro	1:3811
	Non-Metro	1:4835

In addition, Metropolitan Toronto had a greater number of dental hygienists than the other study sites.

Differences in oral health status of the populations in the study areas were reflections not only of variations in visiting behaviour but also of different water fluoridation concentrations and the attitudes and values of the native Canadian and immigrant groups. However, availability of services did seem to influence oral health status. For example, Oshawa and Cornwall both had fluoridated water supplies and similar student DMF indices of 3.8 and 3.9 respectively but Cornwall students had an average of 1.5 decayed teeth compared to Oshawa students who had 0.7 decayed teeth. Cornwall students also visited the dentist less frequently. They had an average of 1.5 visits whereas Toronto students had 2.3, Oshawa 2.0 and Thunder Bay 1.8. The 35 to 44 year age group had significantly different patterns of visiting behaviour. They made average numbers of visits of 1.9 in Toronto, 1.7 in Oshawa, 1.2 in Thunder Bay and 0.9 in Cornwall. Other influences such as the large

numbers of persons with dental insurance also affect the visitation pattern.

Accessibility of Dental Services

Accessibility was investigated in terms of the patients' income, the time required for visits and the distance to the service outlet.

Less than 11 percent of students viewed dental services as inaccessible for economic reasons. Those students had higher DMF indices and greater numbers of decayed teeth. Very few adults cited economic reasons for not going to the dentist. Participants in dental insurance programmes had significantly fewer decayed teeth than their uninsured counterparts but other measures of dental health were not affected.

Greater time spent in travel to or waiting for the dentist resulted in fewer dental visits, more decayed teeth and fewer successfully filled teeth in the student group. Adults who had to wait a long time for services had more teeth affected by gingivitis and needed more treatment than those who did not wait too long for care.

Acceptability of Dental Care

The great majority of students and adults had very favorable opinions of the dentist in terms of occupational status, sensitivity and competency. These opinions were unrelated to their utilization patterns or oral health status.

Predisposing Factors

A number of social and psychological factors affect an individual's use of dental services irrespective of the structural components of the system. Socioeconomic status (SES) is a multi dimensional variable which is often described in terms of education, occupation and income.

The educational attainment of parents was the only measure used in this study to estimate the students' SES since reliable occupation and income data could not be obtained. Students of higher social class had:

- a) more dental visits
- b) lower DMF indices
- c) fewer decayed teeth
- d) fewer missing teeth and
- e) better oral hygiene.

Family size can be used as an indirect measure of social class in that it may determine the amount of disposable income available for health services. Students from larger families had:

- a) fewer dental visits
- b) high DMF indices
- c) more decayed teeth
- d) more missing teeth and
- e) better oral hygiene.

Social class for adults was calculated using Hollingshead and Redlich's two factor scale of occupation and education. Adults of higher social class had:

- a) more teeth
- b) fewer decayed teeth
- c) more successfully filled teeth
- d) fewer missing teeth
- e) fewer teeth affected by gingivitis
- f) fewer teeth affected by periodontitis
- g) lower average debris scores
- h) lower average calculus scores
- i) lower average periodontal scores
- j) lower average Oral Hygiene Indices
- k) lower treatment needs

- l) fewer extraction and restoration needs
- m) more successful treatment
- n) less failed treatment and
- o) more visits to the dentist

Not only did the higher SES adults have a better oral health status, but they also received more treatment in general and more successful treatment in particular. The problem in interpreting the results is that one does not know exactly what aspect of social class is causing the effect. Did the higher classes have better teeth because they had a higher income and thus fewer economic barriers or did their oral health status reflect different health priorities; that is, values and attitudes or was it a combination of the two.

Social class was also studied using number of persons in the household. This variable could be used in conjunction with income to estimate disposable income. It was found that the lower the number of individuals in the household the better the oral health status and the more frequent the utilization of dental services. This, however, could be merely a reflection of differences in age. The 25 to 34 year olds had an average of about 2 persons per household, whereas the 35 to 44 year olds had an average of 4 persons per household. The younger age group had significantly better DMF indices than the older age group. Their better dental health in turn may be a reflection of a higher disposable income, a higher education level or simply the fact that the teeth have been at risk of disease for a shorter period of time.

Sex

Significant differences between male and female oral health measures were found at all ages. It is well known that tooth eruption of 13-14

year old girls is somewhat ahead of their male counterparts. This may account entirely for the significant difference in DMF values of 4.6 for females and 4.0 for males, particularly since the females had a better Oral Hygiene Index of 0.7 versus 0.9 for males and better periodontal scores of 0.2 versus 0.3 for adolescent males. The female students had 3.2 visits to the dentist compared with 2.7 visits for male students.

There was a trend for female students to expect more pain than males but obviously this did not reduce their visits to the dentist.

In both 25 to 34 and 35 to 44 year old adults there was no significant difference in male and female DMF indices. However, females had a significantly fewer decayed teeth and more filled teeth, which would indicate that they made more frequent dental visits. The average number of visits for 25 to 34 year old males was in fact 1.6 and for females, 1.9. The older group males averaged 1.4 visits annually versus 1.7 for the females. Females in both adult groups had significantly better oral hygiene indicators, the debris, calculus and periodontal indices, than males.

Perception of Dental Health

A further predisposing factor affecting oral health status is the respondent's evaluation of his own dental health. This evaluation can include not only the subject's present oral health status and dental habits but also the perception of need for treatment.

Students who brushed more frequently had better dental health in all respects. Ontario students brushed their teeth more frequently than students in the other I.C.S. countries. These habits may be the result of a higher awareness of the importance of dental health or simply of different value systems.

No relationship was apparent between the frequency of 'snacking' and dental health.

Ontario students had a fairly accurate perception of their oral health status. Those who perceived that they had good dental health had significantly lower DMF indices, fewer decayed teeth, fewer missing teeth, lower oral hygiene scores and less orthodontic treatment required than the group that perceived their dental health was not as good. There were also significant differences in DMF indices according to perceived need for care. Those who saw the need for some curative care had a higher DMF index than those who did not perceive this need. The same group had significantly more decayed and missing teeth which affirmed their perception of need.

The adults perception of dental health was investigated by questions with regard to their level of satisfaction with teeth and gums. In general, it would appear that adults had a realistic view of their dental health. For example, higher levels of satisfaction with teeth were significantly related to a lower DMF index, fewer decayed teeth, fewer missing teeth, less periodontitis and fewer teeth requiring treatment.

An appraisal was made of the participants' evaluation of their need for treatment. The more treatment a respondent perceived to be needed, the higher was the DMF index, the number of decayed teeth, the number of missing teeth, the number of teeth needing treatment and the fewer dental visits made.

Although adults appeared capable of evaluating their dental health realistically, a decision to visit the dentist did not always follow the evaluation of need. For those who did not visit the dentist,

the most frequent reason given was that "nothing was wrong". In contrast, 60 percent of those who did visit the dentist, did so for asymptomatic reasons; that is, "nothing was wrong". Although these findings may appear contradictory, it may be that despite a realistic appraisal of dental health, the standards for "nothing wrong" may differ among respondents and similarly, the standards for the time to take action may differ.

Perception of Pain

The factors previously discussed, are those which predispose a person to use a service. On the other hand, pain is a factor which may predispose a person not to use dental services.

Students in the Ontario study who anticipated pain on visiting the dentist had higher DMF indices, higher numbers of decayed teeth and fewer dental visits. It is difficult to determine if the high pain anticipation group had a higher DMF indices because they had had more work done and thus, may have had more occasions to experience discomfort or if their higher DMF indices were the result of delayed treatment because of their desire to avoid pain. Because the high pain group had more decayed teeth, the latter assumption may be correct.

Adults who anticipated more pain had significantly more decayed teeth, fewer successfully filled teeth, more missing teeth, and a higher oral hygiene index. As with the student sample, it would appear that adults who anticipate pain delay dental treatment which results in more decayed teeth and more missing teeth than for those who do not anticipate pain.

The Providers of Dental Services

In Ontario, most dental services are provided by dentists themselves in private offices. However, increasingly, a range of auxiliaries is taking a role in the delivery of services. These include dental assistants, dental technicians, denture therapists and dental hygienists. For the purposes of this report, data were gathered on the demographic characteristics and the practice activities of Ontario dentists and hygienists as well as their attitudes toward dental providers, dental patients and dental services. A random sample of dentists and hygienists was chosen from each of four centres in the study; Toronto, Oshawa, Cornwall and Thunder Bay. An interviewer administered the questionnaire at a time and place convenient to the respondent.

Almost all of the dentists in the sample were male with a median age of 37.5 years. Approximately 77 per cent of the dentists were Canadian-born and 89 per cent were presently married.

Of the dentists who responded to the questionnaire, 82 per cent were in general dental practice. In terms of allocation of work time, a median of 34 hours per week was spent at the chair and one hour per week doing other work. The dentists had 75 patient visits in a week.

The dentists were asked to evaluate their work load. About 75 per cent of the dentists said that patients waited less than four weeks for an appointment. When asked to describe their busyness, 13 per cent said that the appointment list was too long and patients were referred, 6 per cent said that the appointment list was too long but their patients waited, 22 per cent said that they saw all patients but were rushed and overworked, 52 per cent saw all patients but were

not rushed and 7 per cent had time available for more patients.

Dentists were also asked to evaluate how their time was allocated among specific aspects of dental practice. The median values for each activity as a percentage of total time was as follows:

Exclusively oral diagnosis, oral health education, prophylaxis, topical fluorides	18
Extraction: oral surgery	9
Partial dentures: full dentures	9
Crown and bridge: operative dentistry	51
Periodontics	4
Orthodontics	3
Endodontics	6
Total	100

Approximately one-fifth of dentists' time was spent in preventive tasks. They worked an average of 7.5 hours per day and 47 weeks per year. About 52 per cent of dentists worked 5 days a week. The median income was \$46,265.00 per year.

All of the hygienist providers of care were females whose average age was 26 years. Fifty-two per cent were born in Canada and 62 per cent were married.

The hygienists who responded to the survey had been working for an average time of 4 years. The median work week was four days. They saw 120 patients per month and earned an average daily wage of \$69.45.

In terms of allocation of work time during the week, the median hours for specific activities were as follows:

Scaling and polishing	12 hours
Examinations	2 hours
Topical fluorides	1 hour
Oral health education	1 hour
Oral health education planning	0 hours
Application of medicines	0 hours

Most of the work was treatment oriented.

The dentist and hygienist questionnaires included a broad range of questions on attitudes toward the profession and their patients and opinions about the delivery of dental services. For some items data were available for both provider and consumer groups.

In general, some dentists saw two issues to be of paramount importance, their autonomy and the payment mechanism. When asked about quality of care, almost one-third of the dentists said that maximum possible autonomy for the individual dentist was absolutely essential for high quality care. In fact, 18 per cent stated categorically that supervision of work by dental colleagues would be harmful. A further aspect of autonomy involves the use of auxiliaries. Ninety-four per cent of the dentists expressed concern over being professionally accountable for a subordinate's performance.

In terms of a payment mechanism, 34 per cent felt that a fee for service system was absolutely essential and over half (54%) felt that being paid by salary would be harmful to the quality of care.

An important factor in describing the attitudes toward the profession is the level of satisfaction with one's situation and the

perceived potential for change if not satisfied. Most of the dentists and hygienists felt that they had done at least as well as their colleagues in advancing in the profession. However, the majority of dentists felt that they had a great opportunity to advance whereas the majority of hygienists felt that there was little or no opportunity for advancement. Dentists were more likely than hygienists to feel that they had kept up better than their colleagues in terms of technical advances. Fewer hygienists than dentists felt that they were more likely to be doing work that interests them in the future than their colleagues. This may be a reflection of the narrow scope of activities open to hygienists as compared to dentists.

More dentists than hygienists felt that they were more satisfied with their work than their colleagues.

About 40 per cent of dentists and hygienists felt that they would have a very good opportunity to change to a field of employment other than dentistry if they so desired, but only 25 per cent saw the likelihood of changing to a field other than dentistry.

While almost 30 per cent of both hygienists and providers felt that there were opportunities for them to become dental educators, only 12 per cent of dentists stated that they were likely to make that change. In other words, they felt more "locked in" to their present interest in dentistry of private practice. A further perspective on satisfaction is the perception of monetary regards. Twenty-two per cent of hygienists felt that they have done better than average financially, whereas 38 per cent of the dentists felt that way. A majority in both provider groups felt that there was a very good opportunity to increase earnings. However, more hygienists felt confident that they would increase their earnings.

Providers and consumers presumably have a concept of the set of qualities necessary to make a good dental practitioner. Their points of view might be expected to differ as they have different kinds of information available to them. The qualities necessary can be grouped into specific technical dental skills, peripheral technical skills and interpersonal skills. Hygienists, dentists and consumers all felt that technical dental skills and up to date information are extremely important for making a good dental practitioner. Other peripheral technical skills, such as artistic ability and research ability were not seen as being as greatly important by any of the groups. Administrative ability was considered more important by dentists than by the hygienists and consumers.

The ability to handle people and a pleasing personality were seen as very necessary by the majority of the consumer and provider respondents.

The provision of dental services implies some form of interaction between the dentist and the consumer. Consumers are in a position to evaluate the quality of that interaction from the perspective of their own values, attitudes and knowledge base. The assessment of the practitioner was made under the general categories, sensitivity, competency, and availability of the dentist.

If the dentist is sensitive, he may take an interest in his patients, remember them, explain their problems to them and try not to cause them pain.

Consumers were less likely than the providers to feel that dentists take an interest in their patients. More of them also believed that dentists forget about them when their services are completed. More

patients tended to believe that dentists explained problems than did the dentists themselves. Perhaps the patients felt satisfied with the explanations they have been given whereas the dentist would know when the explanation could have been more detailed.

The majority of both dentists and consumers felt that it is "almost always true" that dentists try not to cause pain. Hygienists on the other hand, said that it is "often true", but not "almost always true".

As professionals, dentists have monopolistic control over an abstract body of knowledge. Consumers, therefore, have no special knowledge which would allow them to judge the competency of a dentist the way a practitioner could judge a peer. Nevertheless, almost all consumers and the providers believed that dentists are competent.

As a further measure of competency, 30 per cent of patients and 23 per cent of hygienists believe dentists recommend more things to be done than need to be done. Only 10 per cent of dentists share that opinion. Again, this could be because the patient does not have the same level of understanding of the complexity of his/her problem or of the treatment alternatives that the dentist does. More dentists than hygienists or their patients believe that dentists prefer treatment over prevention. Approximately one-third of patients were not convinced that dentists were readily available compared to 6 per cent of dentists. Most dentists may feel that they are available to their patients at any time, yet their receptionists are often the persons who evaluate the patient's need to see the dentist.

Just as opinions are formulated about the practitioner in dentist-patient interactions, opinions are also formulated about the patient. For example, 80 per cent of hygienists and dentists believed

that patients did not follow advice on personal oral hygiene. Pain is an important component in deterring use of dental services. Ninety-five per cent of hygienists and 77 per cent of dentists felt that patients do fear pain. Dentists, in particular, believed that some of this fear is directed toward practitioners although most hygienists did not share their view. Only 14 per cent of hygienists and dentists felt that patients complain too much about waiting. This, of course, does not imply that patients are satisfied with the amount of time they have to wait, but rather that they do not complain. More dentists than hygienists felt that most patients keep their appointments and that they do not break appointments once made. Twenty per cent of hygienists stated that patients see no need for hygienists. The majority have more positive feelings.

Dentists were asked their opinion of third party payment systems in terms of creating administrative problems, affecting utilization, affecting treatment and affecting autonomy. Seventy-eight per cent of the dentists felt that third party systems created administrative problems, including too much paper work. ¹⁴ Nine per cent stated that these systems increase the lower income groups service utilization. Seventy-eight per cent believed that their practice had expanded as a result of third party payment but 77 per cent did not feel that third party systems caused over-utilization.

Approximately one-third of dentists felt a third party payment system prevents adequate diagnosis and treatment because of coverage limitations; 60 per cent believed that the system does promote preventive dentistry. Twenty-four per cent of dentists felt that third party systems affect their autonomy by interfering with fee setting and 31 per cent that their professional freedom is interfered with by third party payment systems.

Conclusions

The study has provided useful information about the oral health of four age groups of Ontario citizens, opinions of the consumers and providers of dental care and features of the delivery system which affect dental care. It was soundly planned using the World Health Organization International Collaborative Study of Dental Manpower Systems as a model. The team of dentists and interviewers was trained to high standards by David Barmes and Mary Foster, the study sociologist, so that the resultant data are as reliable as possible. The organization and conduct of the survey showed that a reliable large scale dental health survey is possible in a complex country like Canada and that it is possible to obtain a reasonable 70 per cent response from adults.

Some of the data from the oral health examination are worthy of emphasis. The dental caries prevalence among 8 and 9 year old and 13 and 14 year old children was the second lowest of the International Study countries. It is likely that water fluoridation had a great influence on this result. For example, the 50 per cent of students born and raised in communities with fluoridated water supplies had an average of 3.7 DMF teeth, and the 35 per cent of students born and raised in non-fluoride areas had an average of 4.9 DMF teeth. The students also had a very low number of teeth with gingivitis (6.5). This may be attributed to the extensive dental health education programmes throughout the province and the fact that 71 per cent of the students visit the dentist each year. The treatment to need ratio for students at 87 per cent was similar to those of Norway and New Zealand, countries with large scale dental programmes for children.

The adults are not as fortunate as the children since very few were born in fluoridated regions. The average number of DMF teeth of the whole 35 to 44 year age group was 16.4. This is lower than the Australia, Norway or New Zealand averages.

The number of adults with edentulous mouths is not alarming when compared with other countries.

The Canadian born adult population had one third more DMF teeth than the immigrants. It would be worth while to identify why this difference occurred. It seems certain, however, that the next generation of Canadian adults will have much improved dental health due to more available dental care and wide spread water fluoridation.

One could conclude from the oral health data that Ontario dentists are providing a superior service for their patients.

The availability of dental services is important since patients in areas with proportionately fewer dentists made fewer dental visits, received less treatment and had more decayed and missing teeth. However, patients who did visit dentists regularly received dental care that was consistently high in quality and quantity.

Patients find the services offered by Ontario dentists highly acceptable and the dentists are held in high regard.

Socioeconomic status as measured by education, income and occupation appears to be the most powerful factor predisposing to the use of dental services and the attainment of good dental health. It is not clear which aspect of socioeconomic status is the most important determinant of dental health.

The study should provide a useful baseline for future studies which will hopefully demonstrate continued improvement in the dental health of the Ontario population.

FIGURE 1

CARIES PREVALENCE (PRIMARY TEETH)

CHILDREN 8 - 9 YEARS OF AGE

NUMBER OF TEETH

BY STUDY AREA

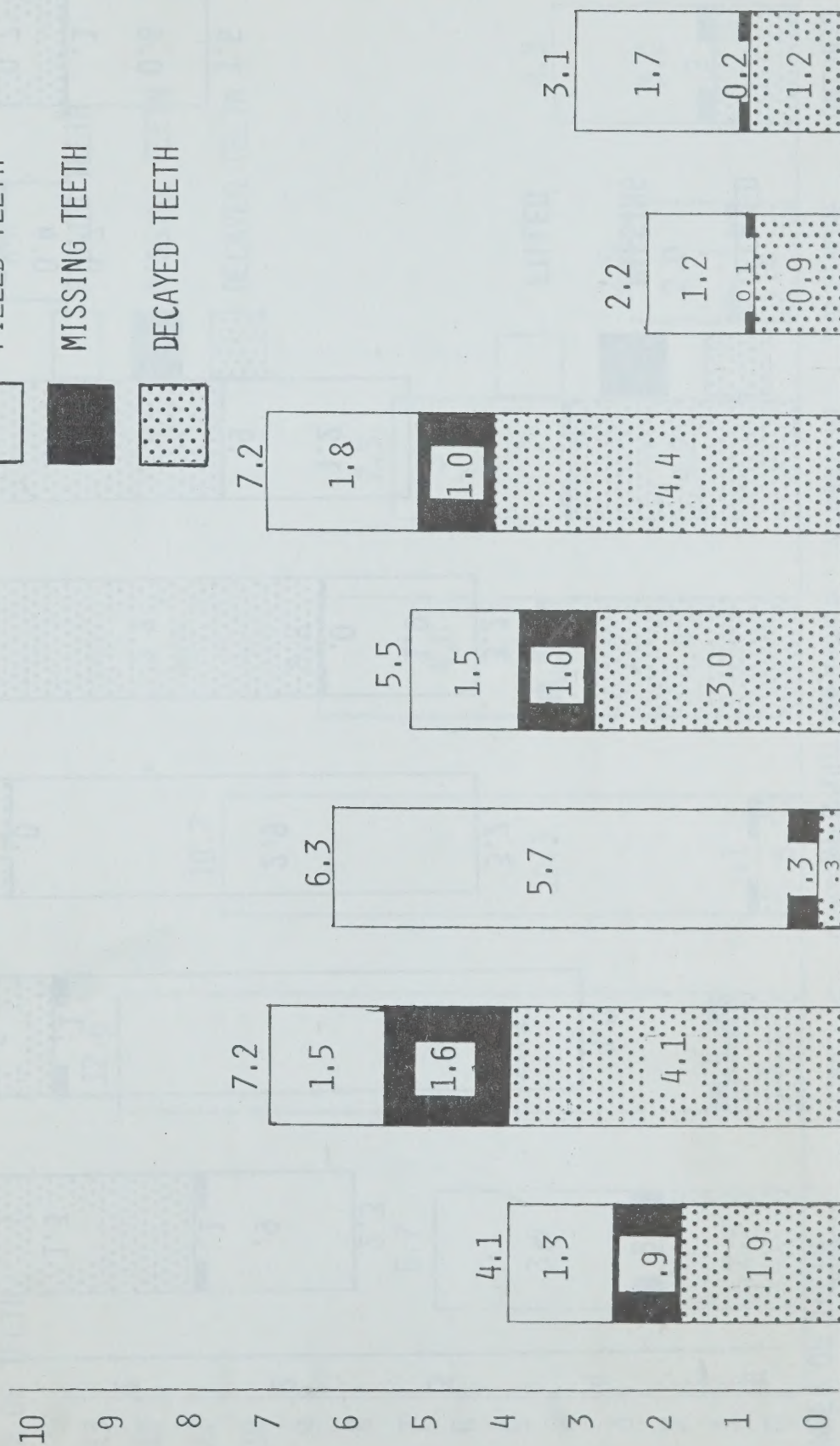
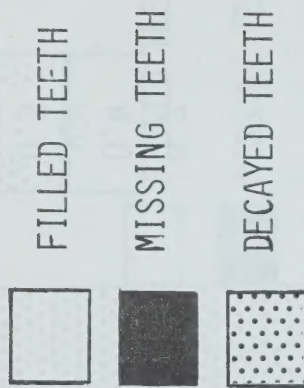


FIGURE 2

CARIES PREVALENCE (PERMANENT TEETH)
CHILDREN 8 - 9 YEARS OF AGE

BY STUDY AREA

NUMBER OF TEETH

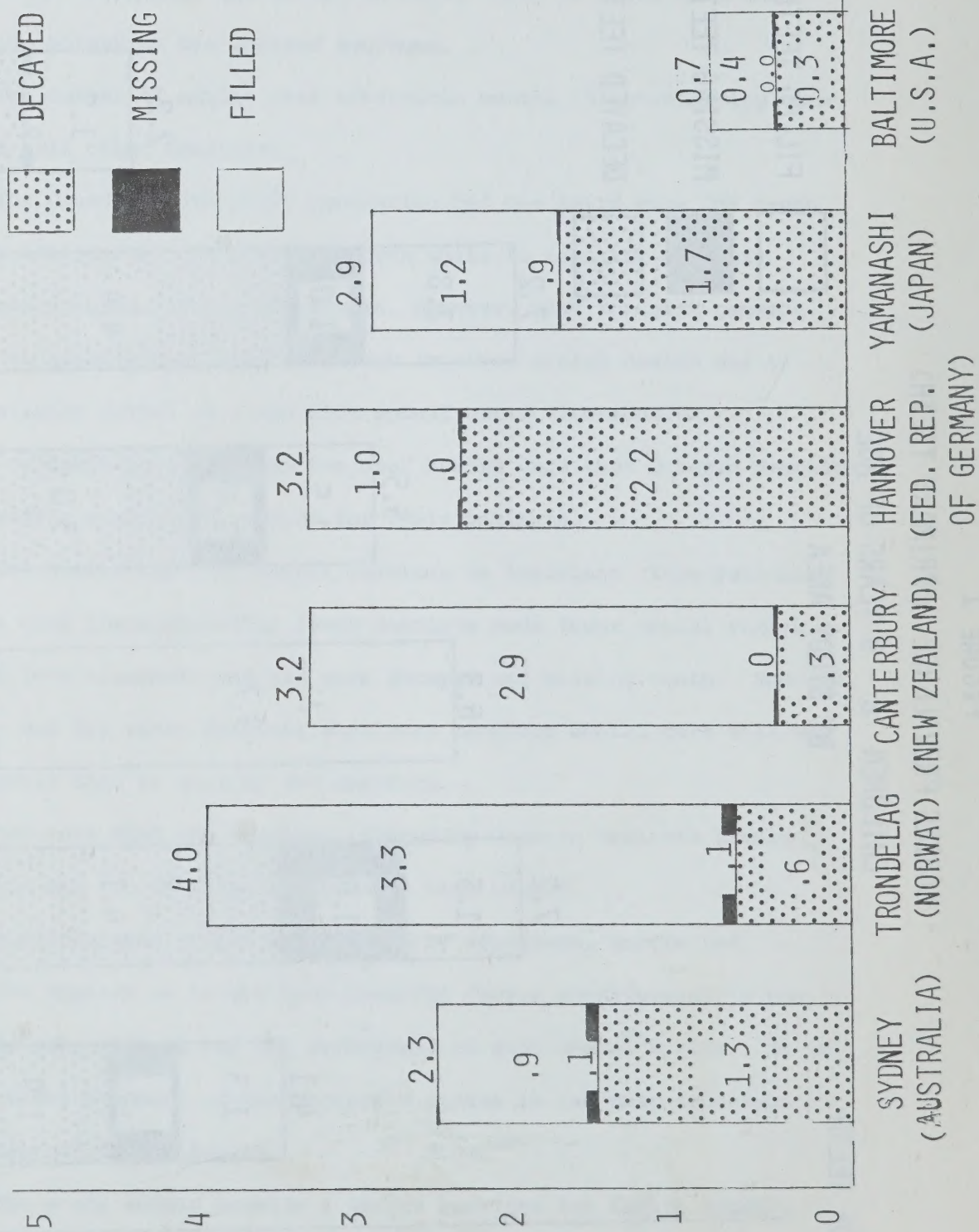


FIGURE 3
CARIES PREVALENCE BY STUDY AREA
STUDENT SAMPLE (13 - 14 YEARS OLD)

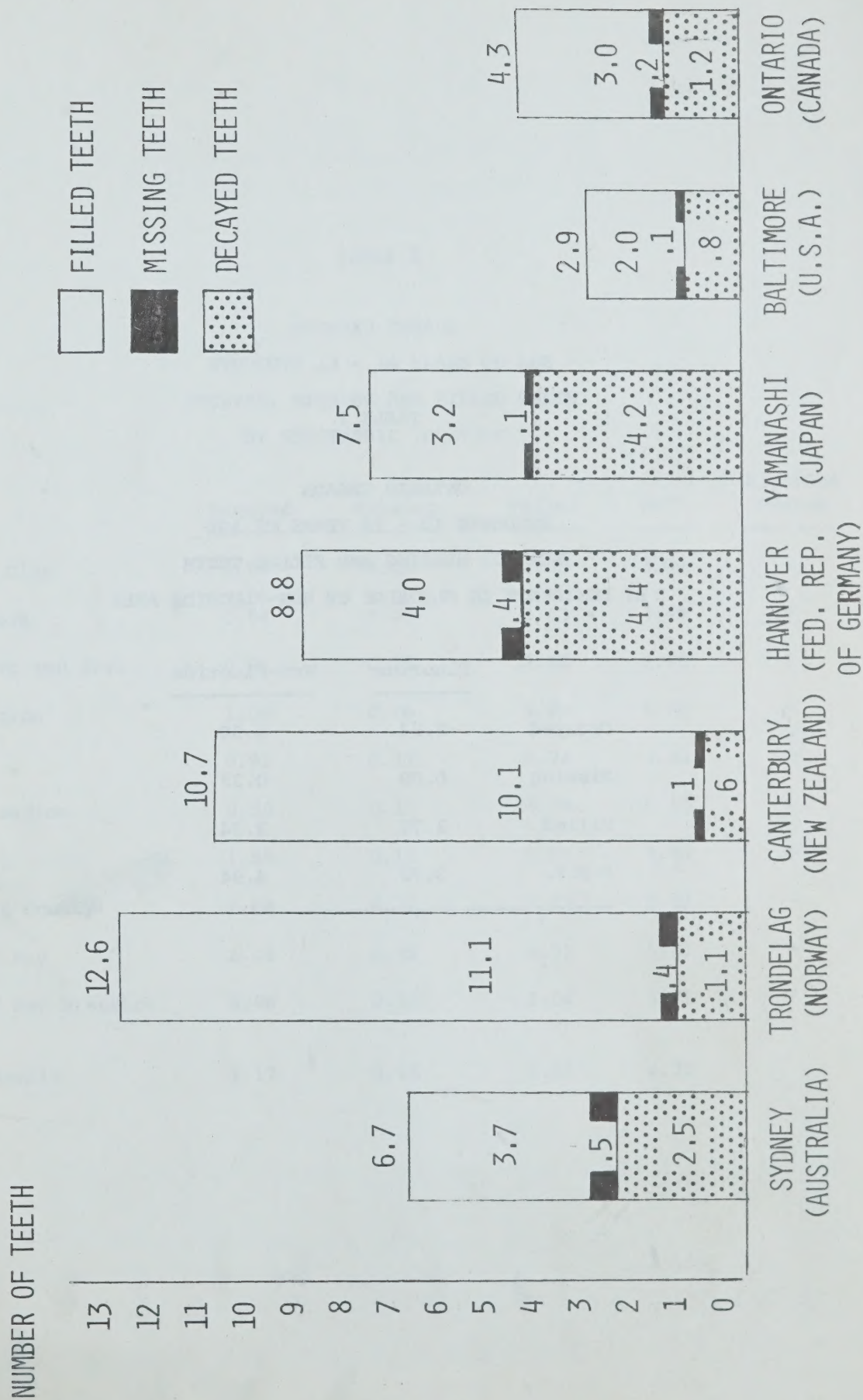


TABLE 1

ONTARIO CANADA
STUDENTS 13 - 14 YEARS OF AGE
DECAYED, MISSING AND FILLED TEETH
BY RESIDENCE IN FLUORIDE OR NON-FLUORIDE AREA

	Fluoride	Non-Fluoride
Decayed	0.93	1.38
Missing	0.09	0.22
Filled	2.70	3.34
D.M.F.	3.72	4.94

TABLE 2

ONTARIO CANADA
STUDENTS 13 - 14 YEARS OF AGE
DECAYED, MISSING AND FILLED TEETH
BY GEOGRAPHIC LOCATION

	<u>Decayed</u>	<u>Missing</u>	<u>Filled</u>	<u>DMF</u>	<u>Fluoride Status</u>
Toronto City	0.98	0.05	2.05	3.09	+
North York	0.64	0.03	2.83	3.49	+
East York and York	0.96	0.21	2.44	3.60	+
York Region	1.00	0.06	4.00	5.06	-
Oshawa	0.92	0.17	2.74	3.83	+
Durham Region	0.90	0.13	4.09	5.12	-
Cornwall	1.58	0.12	2.15	3.86	+
Stormont County	1.84	0.22	3.27	5.32	-
Thunder Bay	2.08	0.35	4.02	6.45	-
Thunder Bay District	0.88	0.29	2.04	3.21	+
Total Sample	1.17	0.15	2.99	4.32	

FIGURE 4

GINGIVITIS SCORES BY STUDY AREA
STUDENT SAMPLE (13-14 YEARS OLD)

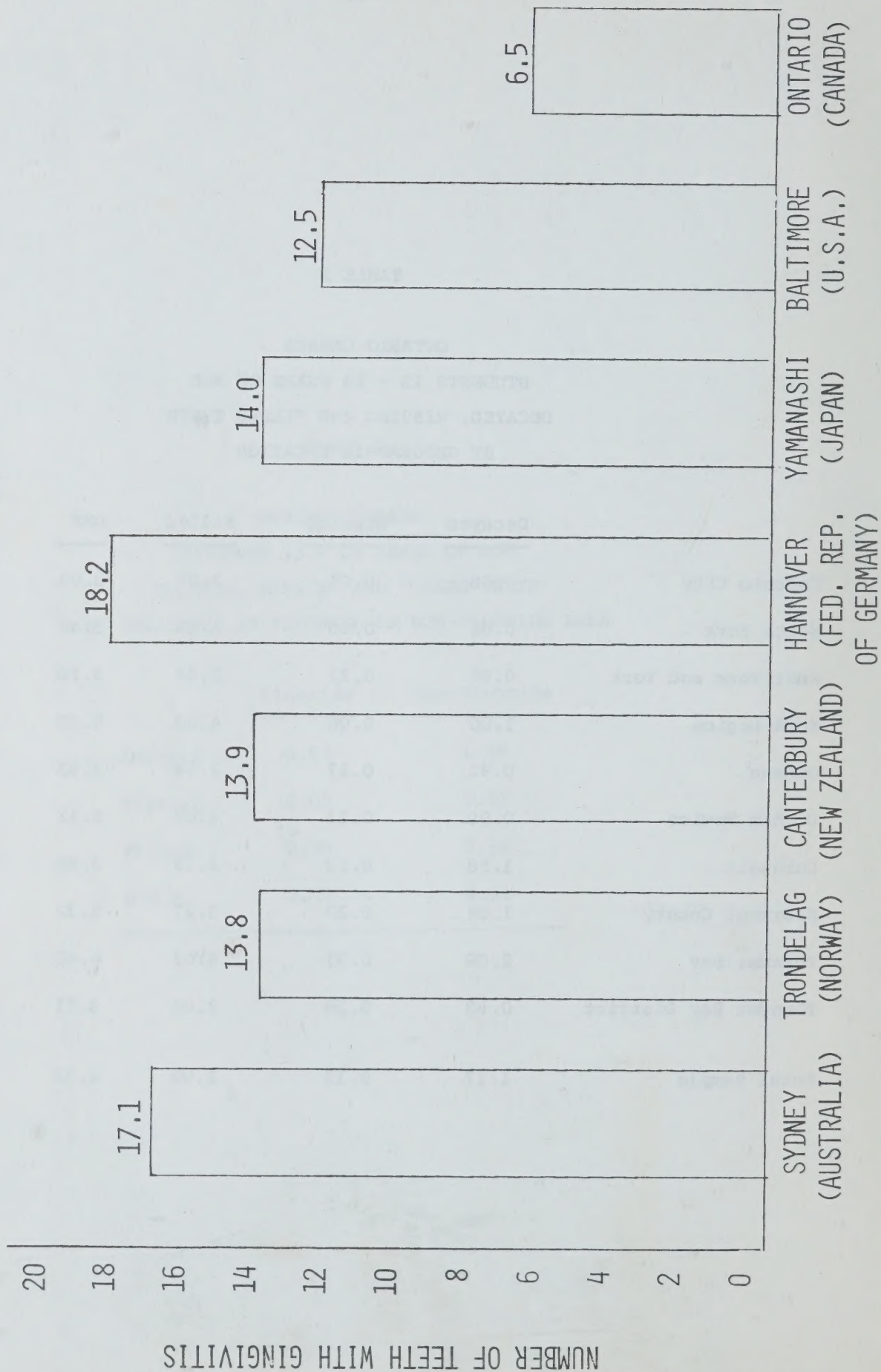


TABLE 3

DISTRIBUTION BY NUMBER AND PERCENT OF
DENTOFACIAL ANOMALIES PRESENT FOR
13-14 YEAR OLDS, ONTARIO SAMPLE, 1978

<u>Condition</u>	<u>N</u>	<u>% of Total Sample</u>
<u>Dentition</u>		
Congenital absence	38	4.1
Supernumerary	10	1.0
Malformed teeth	14	1.5
Impacted teeth	19	2.0
Transposed teeth	2	0.2
Missing teeth	178	19.0
Retained teeth	66	7.1
<u>Space</u>		
Crowding	263	28.1
Spacing	165	17.6
Anterior irregularities	283	30.2
Diastema	132	14.1
<u>Occlusion</u>		
Anteroposterior molar relation	334	35.7
Posterior openbite	49	5.2
Posterior crossbite	182	19.4
Overjet	141	15.1
Overbite	153	16.3
Midline deviation	201	21.5
Soft tissue impingement	31	3.3

FIGURE 5

TREATMENT TO NEED RATIO BY SELECTED SYSTEM CHARACTERISTICS BY STUDY AREA
STUDENT SAMPLE (13 - 14 YEARS OLD)

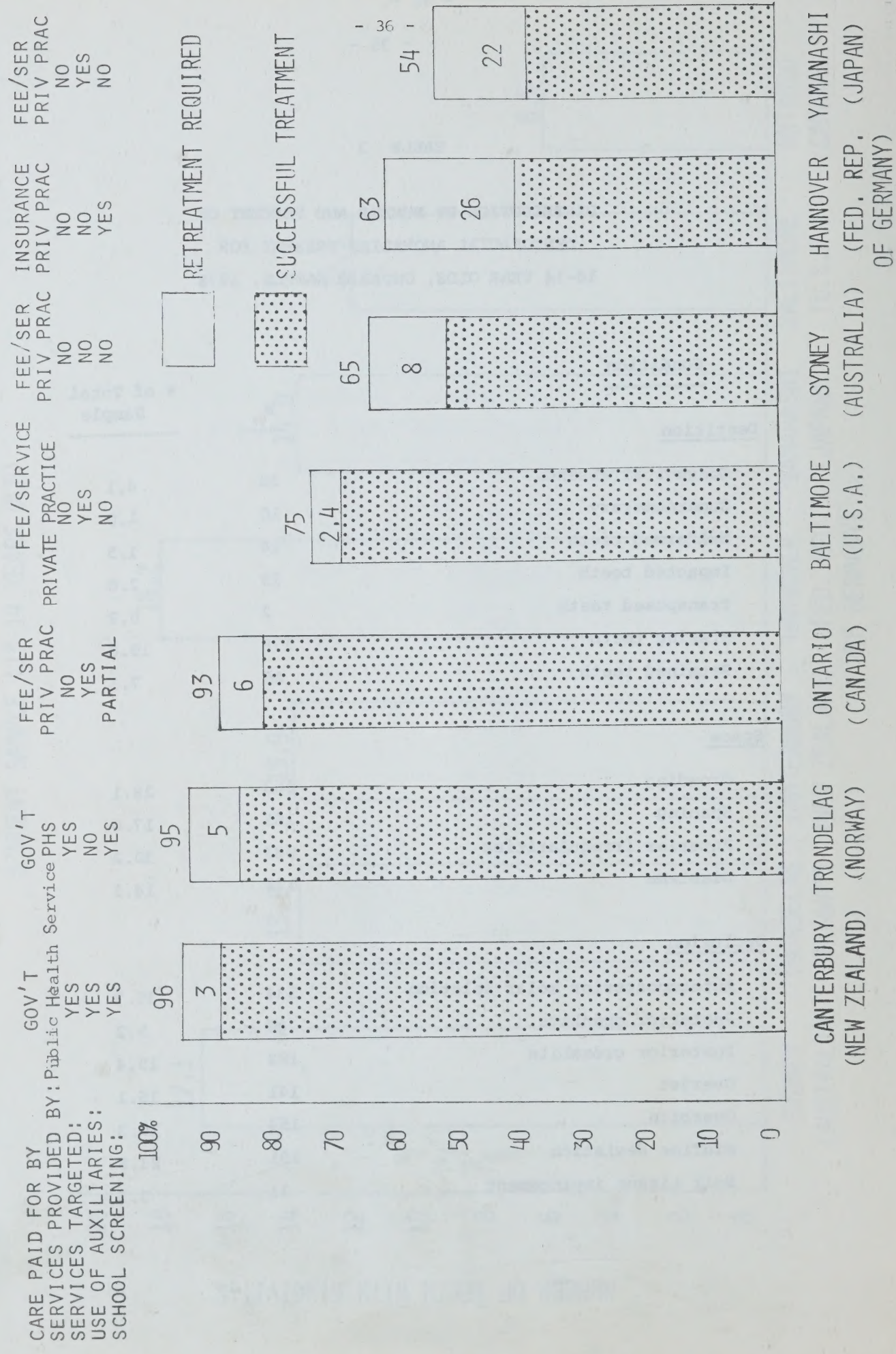


FIGURE 6

DECAYED, MISSING AND FILLED TEETH

FOR TOTAL ADULT SAMPLE AND FOR DENTATE SAMPLE

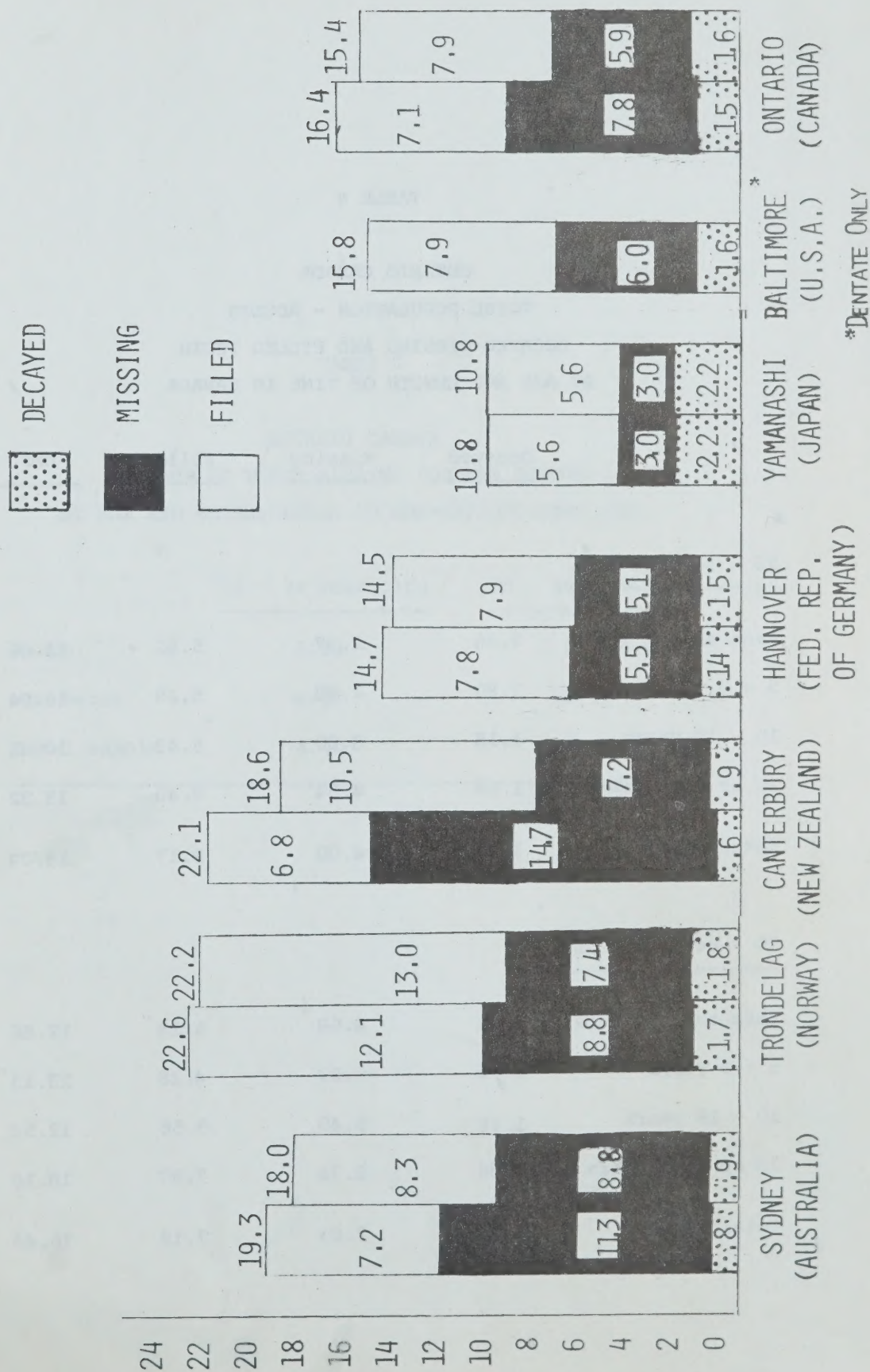


TABLE 4

ONTARIO CANADA
TOTAL POPULATION - ADULTS
DECAYED MISSING AND FILLED TEETH
BY AGE AND LENGTH OF TIME IN CANADA

	<u>Decayed</u>	<u>Missing</u>	<u>Filled</u>	<u>DMF</u>
<u>25 - 34 Year Olds</u>				
Less than 5 years	2.26	2.97	5.82	11.05
5 - 9 years	1.80	2.98	5.25	10.04
10 - 19 years	1.18	3.80	5.43	10.41
20 or more years	1.58	4.34	9.40	15.32
Total sample	1.62	4.00	8.17	13.79
<u>35 - 44 year Olds</u>				
Less than 5 years	2.04	4.68	6.14	12.86
5 - 9 years	1.96	6.89	4.28	13.13
10 - 19 years	1.58	5.40	5.56	12.54
20 or more years	1.36	8.78	7.97	18.10
Total sample	1.47	7.83	7.19	16.48

TABLE 5

ONTARIO CANADA
NUMBER OF TEETH MISSING FOR ANY REASON
BY AGE AND METROPOLITAN OR NON-METROPOLITAN AREA

	<u>25 - 34 Year Olds</u>	<u>35 - 44 year olds</u>
Metro	3.33	6.98
Non-Metro	6.80	10.62
Total sample	4.46	8.36

TABLE 6

ONTARIO, CANADA - ADULTS

<u>Age</u>	<u>Edentulous Both Jaws</u>		<u>Edentulous One Jaw</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
25 - 34	13	2.9	24	5.4
35 - 44	61	8.7	81	11.5

TABLE 7

ONTARIO, CANADA
ADULTS - PROSTHETIC REQUIREMENTS AND TREATMENT

	25 - 34 yr. old adults		35 - 44 yr. old adults	
<u>Dentures</u>	N	%	N	%
Have none - need none	330	74.8	355	50.6
Have none - need some	44	10.0	124	17.7
Have some - need none	33	7.5	106	15.1
Have some - need some	34	7.7	117	16.7
Total	441	100.0	702	100.0
<u>Bridges</u>				
Have none - need none	273	62.0	406	57.8
Have none - need some	157	35.6	227	32.3
Have some - need none	9	2.0	44	6.3
Have some - need some	2	0.45	25	3.6
Total	441	100.0	702	100.0

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